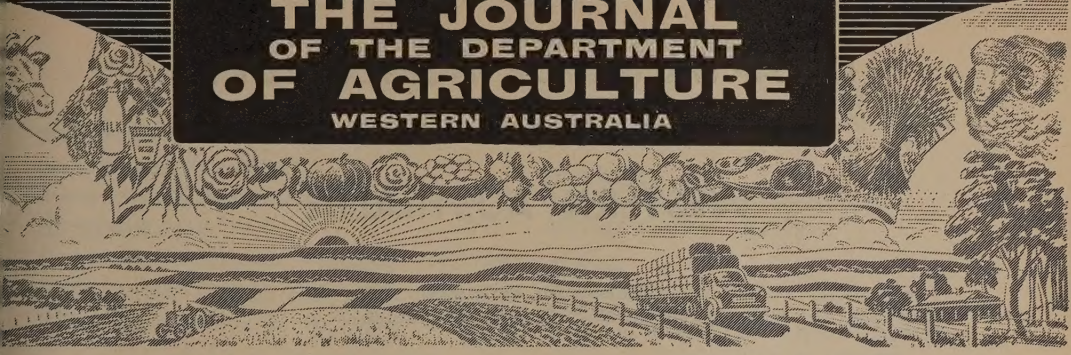
THE JOURNAL OF THE DEPARTMENT OF AGRICULTURE
WESTERN AUSTRALIA



VOL. 1 (Fourth Series) FEBRUARY, 1960 No. 2

Issued by direction of the Minister for Agriculture, and published monthly by the Department of Agriculture, Perth, Western Australia.

Annual Subscription Rates (inclusive of postage) are:—
Australia and New Zealand .... 20s.
Other British Commonwealth Countries .... 23s.
Foreign Countries 29s.
Single copies, 2s. each.

Edited by
J. A. MALLETT

Articles which appear in the Journal may be reprinted, provided that both the Journal and the authors are acknowledged.

COVER PICTURE

Stud rams on The Boolardy Pastoral Company's "Cranmore Park" property, Walebing

In this Issue

	Page
Trees of Western Australia .... C. A. Gardner	101
Farm and Home .... Helen M. Gloster	113
Termites or "White Ants" .... C. F. H. Jenkins	117
Pig Pox .... F. C. Wilkinson	125
The Corriedale .... J. A. Mallett	129
Honey Flora Calendar for March .... A. R. Coleman	134
The Geraldton Strain of Sub. Clover .... A. J. Millington	137
Autumn v Spring Shearing .... W. L. McGarry and I. K. Stott	147
Zamia Palm Poisoning .... F. C. Wilkinson	151
Books for Farmers	155
How Much Food Should I Give My Dog? .... F. C. Wilkinson	157
Weed Control Around the Yard .... G. A. Pearce	161
Australian Spark Arrester Tests—Caterpillar 3B-2655	171
Overcoming Stock Watering Problems in the Kimberleys B. Swan	175

By Authority: ALEX. B. DAVIES, Government Printer

31901/1/60—17,100

DEPARTMENT OF AGRICULTURE

OF

WESTERN AUSTRALIA

Minister for Agriculture:
THE HON. C. D. NALDER, M.L.A.

Director of Agriculture:
G. K. BARON HAY.

Deputy Director of Agriculture:
T. C. DUNNE.

Chief Administrative Officer:
W. HOPKINSON.

ABATTOIRS

Controller.—T. C. ROWLANDS.

ANIMAL DIVISION

Chief Veterinary Surgeon and Chief Inspector of Stock.—C. R. TOOP.

Assistant Chief Veterinary Officer.—J. SHILKIN.

ANIMAL HEALTH AND NUTRITION LABORATORIES

Principal.—H. W. BENNETTS.

Animal Nutrition Officer.—L. C. SNOOK.

Veterinary Pathologist.—M. R. GARDINER.

POULTRY

Officer-in-Charge.—R. H. MORRIS.

BRANDS

Registrar of Brands.—C. R. TOOP.

HORTICULTURAL DIVISION

Superintendent.—H. R. POWELL.

Assistant Superintendent.—J. P. ECKERSLEY.

FRUIT

Senior Adviser.—F. MELVILLE.

Viticulturist.—W. R. JAMIESON.

VEGETABLES

Senior Adviser.—J. P. FALLON.

TOBACCO

Adviser.—A. E. BAKER.

APICULTURE

Officer-in-Charge—R. S. COLEMAN.

DAIRYING DIVISION

Superintendent.—M. CULLITY.

Assistant Superintendent.—H. G. ELLIOTT.

Agrostologist.—F. E. RYAN.

Dairy Cattle and Pig Husbandry Officer.—K. NEEDHAM.

WHEAT AND SHEEP DIVISION

Superintendent.—F. L. SHIER.

Assistant Superintendent.—A. S. WILD.

Senior Adviser Meat Production.—N. DAVENPORT.

SHEEP AND WOOL

Officer-in-Charge.—W. L. McGARRY.

SOILS DIVISION

Superintendent and Commissioner of Soil Conservation.—L. C. LIGHTFOOT.

Senior Soil Research Officer.—S. T. SMITH.

IRRIGATION

Officer-in-Charge.—H. J. K. GIBSONE.

PLANT RESEARCH DIVISION

Superintendent.—G. H. BURVILL.

Senior Plant Research Officer.—L. T. JONES.

BOTANY

Government Botanist and Curator of State Herbarium.—C. A. GARDNER.

BIOLOGICAL SERVICES DIVISION

Superintendent.—W. P. CASS SMITH.

PLANT PATHOLOGY

Senior Plant Pathologist.—H. L. HARVEY.

ENTOMOLOGY

Government Entomologist.—C. F. H. JENKINS.

SEED CERTIFICATION AND WEEDS

Officer-in-Charge.—G. R. W. MEADLY.

MURESK AGRICULTURAL COLLEGE

Principal.—W. SOUTHERN.

Assistant Principal and Senior Lecturer.—A. J. T. MARSHALL.

RURAL ECONOMICS

Officer-in-Charge.—R. P. ROBERTS.

NORTH-WEST BRANCH

Officer-in-Charge.—W. M. NUNN.

VERMIN BRANCH

Officer-in-Charge.—A. R. TOMLINSON.

PUBLICATIONS

Officer-in-Charge.—J. A. MALLETT.

LIBRARY

Librarian.—Miss A. E. M. WHITE.

DISTRICT OFFICES

ALBANY

Officer-in-Charge.—J. M. ARMSTRONG.
Advisory Services.—Veterinary, Stock, Horticulture, Weed Control, Vegetable-growing.

BRIDGETOWN

Officer-in-Charge.—S. E. HARDISTY.
Advisory Services.—Dairying, Stock, Horticulture, Vermin Control, Wheat and Sheep.

BROOME

Officer-in-Charge.—G. A. SMITH.
Advisory Services.—Cattle Management, Stock Inspection.

BUNBURY

Officer-in-Charge.—R. HARLEY.
Advisory Services.—Veterinary, Dairying, Irrigation, Stock, Horticulture, Vegetable-growing, Weed Control.

BUSSELTON

Officer-in-Charge.—R. A. BETTENAY.
Advisory Services.—Dairying, Vermin Control.

CARNARVON

Officer-in-Charge.—H. SUIJDENDORP.
Advisory Services.—Tropical Agriculture, Pastoral Rehabilitation.

DENMARK

Officer-in-Charge.—R. SPRIVULIS.
Advisory Services.—Dairying.

DERBY

Officer-in-Charge.—K. FITZGERALD.
Advisory Services.—Tropical Agriculture, Pastoral Rehabilitation, Stock Inspection.

ESPERANCE

Officer-in-Charge.—G. R. GREWAR.
Advisory Services.—Wheat and Sheep, Weed Control.

GERALDTON

Officer-in-Charge.—G. L. THROSSELL.
Advisory Services.—Wheat and Sheep, Veterinary, Weed Control, Vermin Control, Soil Conservation, Stock.

HARVEY

Officer-in-Charge.—
Advisory Services.—Irrigation.

KATANNING

Officer-in-Charge.—G. T. HALPIN.
Advisory Services.—Wheat and Sheep, Stock, Vermin Control.

MANJIMUP

Officer-in-Charge.—A. E. BAKER.
Advisory Services.—Dairying, Tobacco, Fruit and Vegetable-growing, Veterinary.

MERREDIN

Officer-in-Charge.—D. B. ARGYLE.
Advisory Services.—Wheat and Sheep, Vermin Control.

MOORA

Officer-in-Charge.—G. H. NEIL.
Advisory Services.—Wheat and Sheep, Stock, Weed Control, Vermin Control.

MT. BARKER

Officer-in-Charge.—A. F. SMITH.
Advisory Services.—Wheat and Sheep, Horticulture, Vermin Control.

NARROGIN

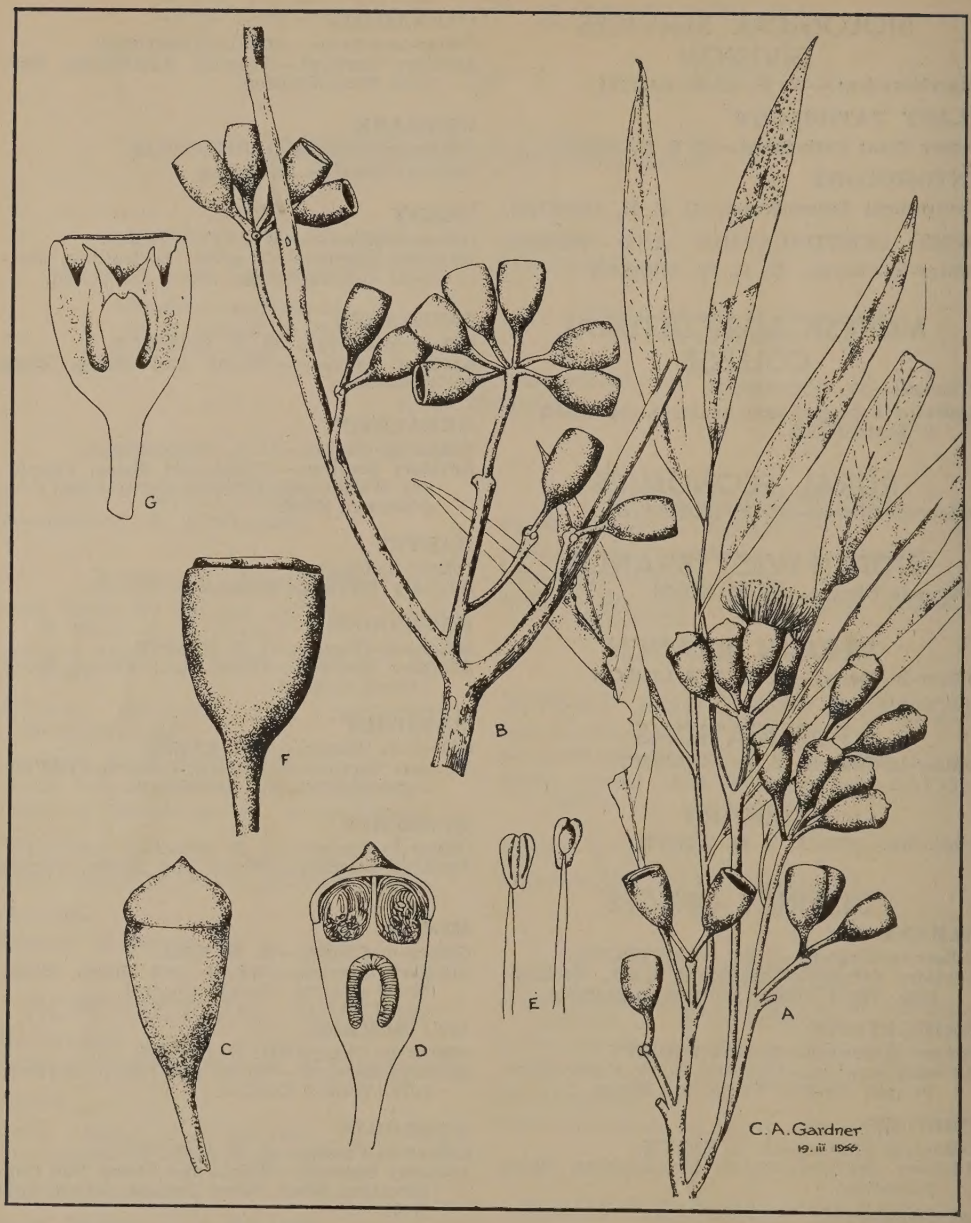
Officer-in-Charge.—T. E. McDOWELL.
Advisory Services.—Wheat and Sheep, Soil Conservation, Stock, Weed Control, Vermin Control.

NORTHAM

Officer-in-Charge.—J. E. WATSON.
Advisory Services.—Wheat and Sheep, Soil Conservation, Vermin Control, Weed Control.

WILUNA

Officer-in-Charge.—D. G. WILCOX.



THE COMET VALE MALLEE

(Eucalyptus comitae-vallis Maiden)

A—Branchlets with buds, flowers and fruits; B—Branchlet with fruits; C—Flower-bud; D—Section of flower-bud; E—Stamens; F—Fruit; G—Section of fruit

[Comet Vale, Jutson (type)]

TREES

of Western Australia

By C. A. GARDNER, Government Botanist

No. 39—COMET VALE MALLEE

(*Eucalyptus comitae-vallis* Maiden)

THIS mallee, formerly thought to be restricted to the Comet Vale district, must be very rare in that locality, since it is seldom found growing there, but on the other hand it has an extensive range, being found as far west as Perenjori. Kalannie and Kulja, thence eastwards to Comet Vale, and southward to Mount Holland which lies south of Southern Cross.

It is particularly common between Kulja and Mollerin, occurring as a mallee up to 20 ft. tall, with several stems from a large bulbous stock, or rarely with few stems, and still more rarely as a small tree. The bark of the upper stems and branches is smooth, grey and warm greenish-brown, thin and shedding in small flakes, whilst the bark of the lower parts is almost black and fibrous, flaky, and persistent. The foliage is a deep lustrous green except for one patch seen close to the Kulja townsite. In these specimens, the bark is totally rough —not unlike that of the trunk of a York-gum—and the leaves are broader than in the typical form, and a dull grey-green in colour.

The greatest variety is found in the bud-cap or operculum. The accompanying plate is taken from the original (type) specimen from Comet Vale, but between Kulja and Bodallin (on the eastern railway not far from Carrabin) the operculum is very small and much narrower than the calyx, with a characteristic constriction of the bud where the bud-cap meets the calyx. Furthermore, the Bodallin mallees have a smooth white bark. Even more constricted are the buds from the Mount Holland specimens. This form, also common between Koorda and Wyalkatchem, was named *Eucalyptus brachycorys* by Blakely.

No. 40—THE WOODLINE MALLEE

(*Eucalyptus cylindrocarpa* Blakely)

SPECIMENS of this plant, originally collected by Professor J. B. Cleland, bore a label inscribed "Woodline—60 miles south of Coolgardie, September 1926." The reference was, of course, to the "Kurrawang Woodline," which supplied fuel and mining timbers to the goldfields, but apparently this was misread and, in a description published in 1934, the plant was referred to as the "Woodbine Mallee."

This species has a wide range of distribution and is one of the commonest mallees to be found between Widgiemooltha and Kumarl, sometimes occurring as a tree not unlike the salmon gum, with which the mallee form is not uncommonly associated.

It extends eastward to Zanthus on the Transcontinental Railway. The typical form is a mallee about 18 ft. high with

THE WOODLINE MALLEE

(*Eucalyptus cylindrocarpa* Blakely)

A—Leaf; B—Portion of leaf with epidermis removed showing oil cavities and veins; C—Branchlet with flower-buds; D and E—Flower-buds; F—Section of flower-bud; G—Anther; H—Twig with fruits; K—Section of fruit.

THE RIBBON-BARKED MALLEE

(Eucalyptus Sheathiana Maiden*)*

A—Buds (King's Park, Perth—Sheath); B—Buds (near Nungarin-Brockway); C—Buds (Wyalkatchem—J. Reeves); D—Buds (Carrabin—Gardner 11828); E—Anthers from Sheath's specimens; F—Section of fruit (Gardner 11828)

a rough bark on the lower parts of the stems and the bark of the upper portions varying in colour from greenish red to light grey. The tree form has a perfectly smooth bark resembling that of the salmon gum, but the leaves are narrower and the branchlets tend to droop. The leaves are rich in oil.

Although the Woodline Mallee is closely related to *Eucalyptus Dundasi* it does not resemble this tree in anything but the foliage and the buds and fruit which are never constricted in the middle and never angular. *Eucalyptus Dundasi* has a characteristic tessellated dark green bark which renders it distinctive.

No. 41—THE RIBBON-BARKED MALLEE

(*Eucalyptus sheathiana* Maiden)

IN 1915, the late J. H. Maiden described a Eucalyptus from material received from Mr. J. Sheath, the Superintendent of The King's Park, Perth, and which he named after Mr. Sheath, who stated that seed was received from the Eastern Goldfields near the South Australian border.

In 1917, a further specimen from the Kununoppin district was collected probably by Victor, who stated that it occurred in a variety of soils. Much interest was attached to this species because of these circumstances, and it was not found to be common in the Kununoppin district, in fact, was not rediscovered until about three years ago when the writer connected the name with the common ribbon-barked mallee of the Yorkrakine area, growing on grey alluvial loamy soil associated with wandoo. This mallee was found to be particularly common from Hine's Hill eastwards to Ghooli, and still later was found commonly around Nembudding.

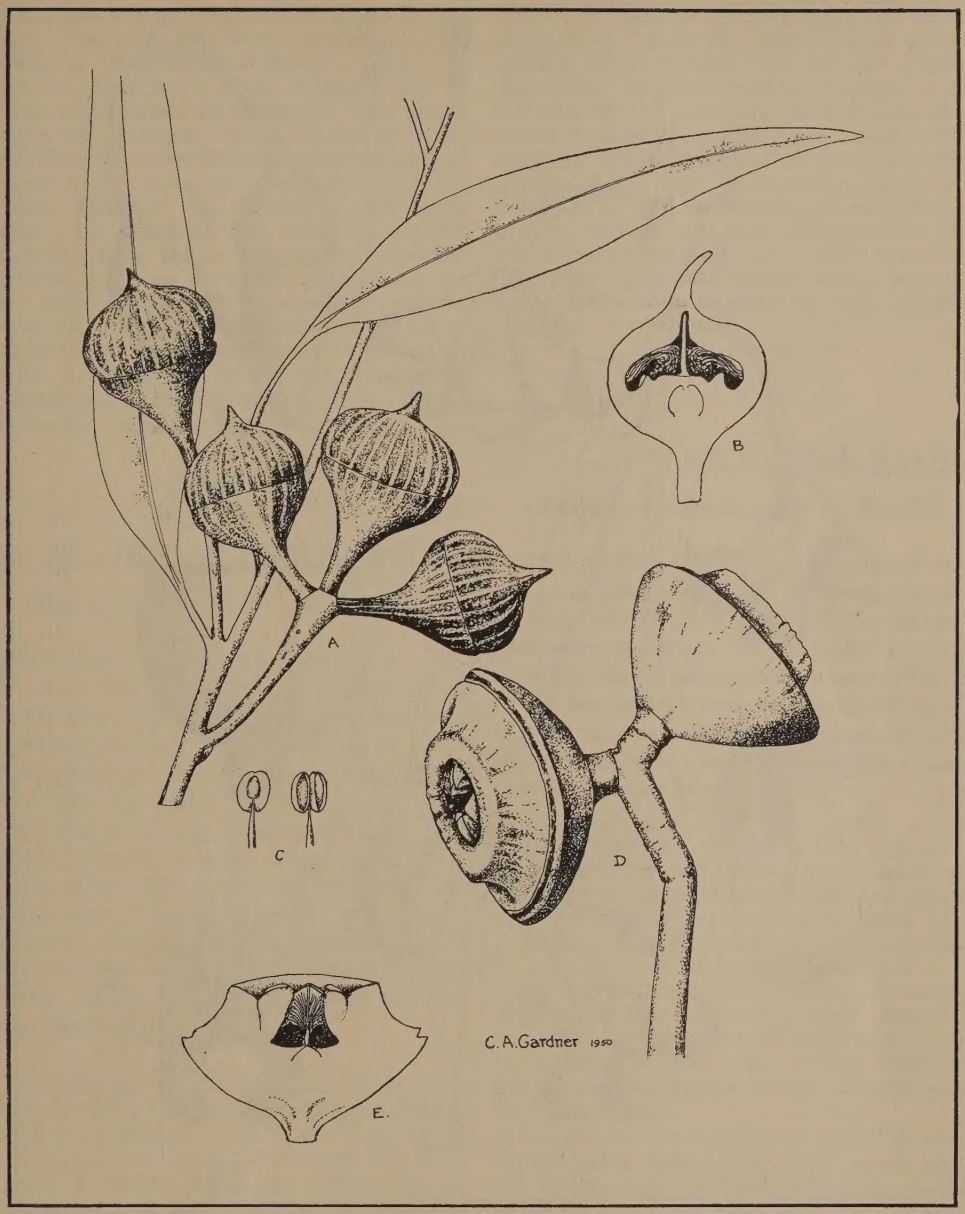
The most peculiar feature of this species is the bark, which sheds in long ribbon-like flakes from the branches to the base of the stem, becoming free except at the top, and hanging for many weeks from February until August in this peculiar fashion. The stocks and the stems are usually freely attacked by termites which eat out all the heartwood, so that the older clumps usually have hollow and decaying stems surrounding the basal stock. The writer has not yet discovered a mature stem that was not so attacked. Although the bark is commonly referred to as smooth, it is rather rough and "prickly" to the touch, and is a pale yellow-brown in colour. The foliage is grey-green, and the blossoms are pale yellow in colour. When in blossom (March to August) this mallee is very attractive in its general appearance.

No. 42—THE BURRACOPPIN MALLEE

(*Eucalyptus burracoppinensis* Maiden et Blakely)

IT is unfortunate that some authors should bestow place names on plants, especially when they are found in country which is botanically comparatively unexplored. We have, for example, Eucalyptus ebbanoensis named after a water hole at Ebbano near Mingenew, but equally if not more common northwards from Kalgoorlie; Eucalyptus comitae-vallis from Comet Vale is another which has a very extensive distribution, Comet Vale being at the eastern limit of its occurrence, and the species now under consideration (Eucalyptus burracoppinensis) which was originally thought to be restricted to Burracoppin, but which extends from Wyalkatchem and Bungulla eastwards to Karallee, northwards to Lake Brown and Campion, and southwards to near Kulin.

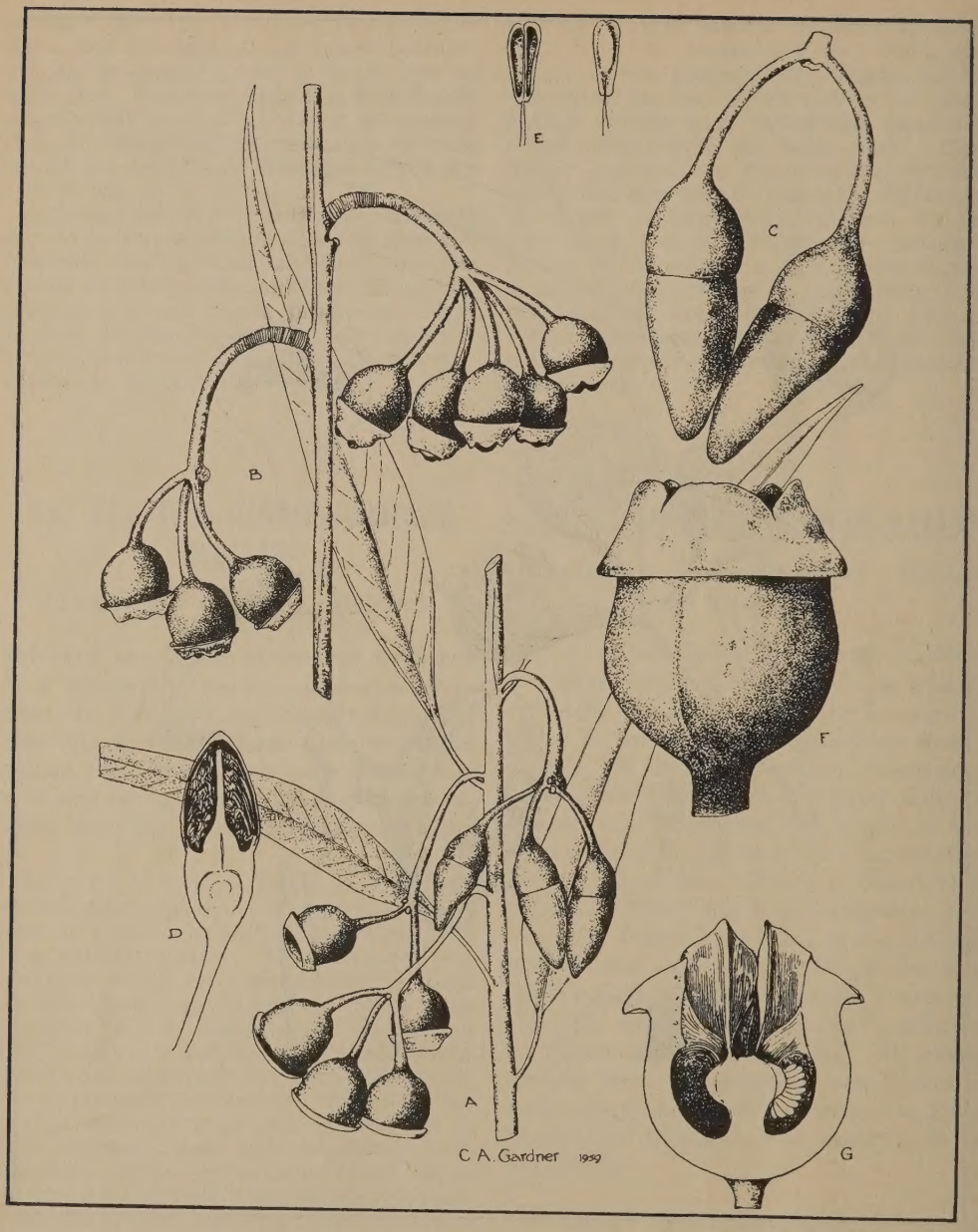
Of all the inland mallees which have a place in agricultural development as plants for windbreak purposes, this mallee should be of paramount importance in inland localities. Although in its natural state it may attain a height of nearly 18 ft. with erect rigid branches when growing



THE BURRACOPPIN MALLEE

(Eucalyptus burracoppinensis Maiden et Blakely)

A—Twig with leaves and flower-buds; B—Flower-bud in section; C—Anther (enlarged); D—Fruits; E—Section of fruit



THE CAP-FRUITED MALLEE

(Eucalyptus Dielsii C. A. Gardn.)

A and B—Branchlets with flower-buds and fruits; C—Flower buds; D—Section of flower-bud; E—Anthers; F—Fruit; G—Section of fruit. (C, D, E, F and G variously enlarged)

[icon origin.

in thicket formations, its behaviour in the more open country, and especially along roadsides is entirely different. Here it seldom exceeds 10 ft. in height, and is often even more in diameter, the dense branches spreading down to the ground, and forming a thick mass of branches and leaves rarely seen in other species if we except some of the species of the south coast. The bark of the trunk is a dark grey or almost black, that of the branches smooth and red or green in colour, and the foliage has a characteristic yellow-green colour, sometimes almost a blue-green. The large flowers are creamy white, borne in clusters of three, and the species is eagerly sought by bees and other insects. It flowers from October to January.

No. 43—THE CAP-FRUITED MALLEE

(*Eucalyptus Dielsii* C. A. Gardn.)

THIS species was first collected by Mr. W. T. Brown, a farmer of Salmon Gums in January, 1925, and the description was published in 1926. Like a number of hitherto unknown species it was regarded as rare until the writer in 1929 found it near Peak Charles in the Fitzgerald Peaks, and again between Salmon Gums and Grass Patch, where it is a common mallee of the heavy clay "crab-hole" soils. It has subsequently been found to extend to near Ravensthorpe—at least to the Rabbit-proof Fence, always being indicative of the soil type mentioned.

The species is a mallee with erect stems from a small stock, and attains to a height of 20 ft., although usually less than 12 ft. tall, with slender stems covered with a thin green or reddish bark not unlike that of the gimlet. It is interesting to associate types of bark with different soil conditions, since there is a definite connection with many species, particularly those of the heavy clay soils and those restricted to granite outcrops, the latter frequently having a green inner bark overlaid by an outer crisped cinnamon-coloured bark. *Eucalyptus Dielsii* has erect bright green, lustrous foliage like that of the gimlet tree, but the most notable feature is in the disc of the fruit which is domed and much broader than the calyx. This is the result of the development of the outer disc which, at the time of flowering, lines the lower part of the bud-cap (operculum), and is only to be found otherwise in the white mallee (*Eucalyptus erythronema*). The flowers of *Eucalyptus Dielsii* are always white, and appear in the summer months.

No. 44—THE SPEARWOOD MALLEE

(*Eucalyptus doratoxylon* F. Muell.)

THIS mallee is probably so-named because the stems which are unusually straight and slender, were used for making spears by the early south coastal natives. It is always a mallee, seldom exceeding 15 ft. in height but more commonly 6 to 10 ft. tall, the bark being white and smooth, thin in texture, and shedding in small reddish-purple flakes.

The leaves are almost always opposite, erect or spreading, and a lively green in colour. The flowers and fruits are borne on umbels with slender peduncles and pedicels, and are drooping. The bud-cap or operculum is sharply beaked, and of a yellowish-white colour which contrasts with the green calyx-tube. The filaments are white, and the flowers relatively small. It flowers in the late spring months. Altogether this species is both slender and very attractive.

Eucalyptus doratoxylon is found mainly on the stony hills of the south coast from the Stirling and Porongorup Ranges as far eastward as Cape Arid and the Russell Range. It exhibits a preference for protected situations in rocky places, either in granite, sandstone or quartzite, and ascends the Stirling Range to an altitude of 3,000 feet, and to the summits of the Barren Mountains to the east.

THE SPEARWOOD MALLEE

(Eucalyptus doratoxylon F. Muell.)

A—Branchlet with leaves and flower-buds; B—Flower-bud; C—Anther; D—Fruit in section; F—Seeds [Toolbrunup, Gardner

No. 45—THE APPLE MALLEE

(*Eucalyptus buprestium* F. Muell.)

ABOUT the year 1862, G. Maxwell, who was collecting for Baron von Mueller, Government Botanist of Victoria, collected this mallee on the Kalgan Plains between Ellen's Peak and the Pallinup River. He noted that the flowers attracted large numbers of jewel beetles (Buprestideae) and thus Mueller gave the species the name buprestium.

Apparently it was not at the time known that most of our summer-flowering mallees commonly attract species of Stigmodera in large numbers and of many species, so that the name given to this plant is not very appropriate. On the other hand, the fact that this Eucalyptus has a remarkable characteristic in that the small globular apple-like fruits remain soft until the seeds are ripe, suggests the common name given above.

Eucalyptus buprestium has a somewhat restricted range in the south, being found only around the Stirling Range, on both the north and south sides, but more commonly to the south. It is found in sandy places, and may reach a height of 15 ft., but is commonly much smaller (6 to 8 ft.) with thin erect stems and a pale yellow smooth bark, although the branchlets are purplish. The small leaves are thin, bright green in colour, and prominently and openly veined. The small flowers are white and the globular fruits have a deeply immersed capsule. It is related to the coastal blackbutt (*Eucalyptus Todtiana*), (but is never a tree just as the latter is never a mallee), and has a characteristically rough prickly bark and thicker pale leaves. The species, apart from the range given, occurs in a few places to the north. Mr. D. H. Perry found it on the Mundaring Catchment Area in 1952, and Mueller records it from the Arrowsmith River.

No. 46—THE GOBLET MALLEE

(*Eucalyptus scyphocalyx* [F. Muell.] Maiden et Blakely)

THE development and opening up of our agricultural areas, while in some cases leading to the unfortunate extermination of certain rare species, has, on the other hand rendered accessible certain areas for botanical exploration which were previously unknown. The mallee illustrated has long been regarded as a very imperfectly-known and rare plant which was originally discovered at Eyre's Relief Camp, on the Great Australian Bight, probably by George Maxwell, who made no notes on its habit or distribution.

Mueller named it *Eucalyptus dumosa* var. *scyphocalyx* on account of the goblet-shaped calyx, which can be seen by reference to A on the accompanying plate, which was drawn from the original specimen in the National Herbarium of the Royal Botanic Gardens, Sydney.

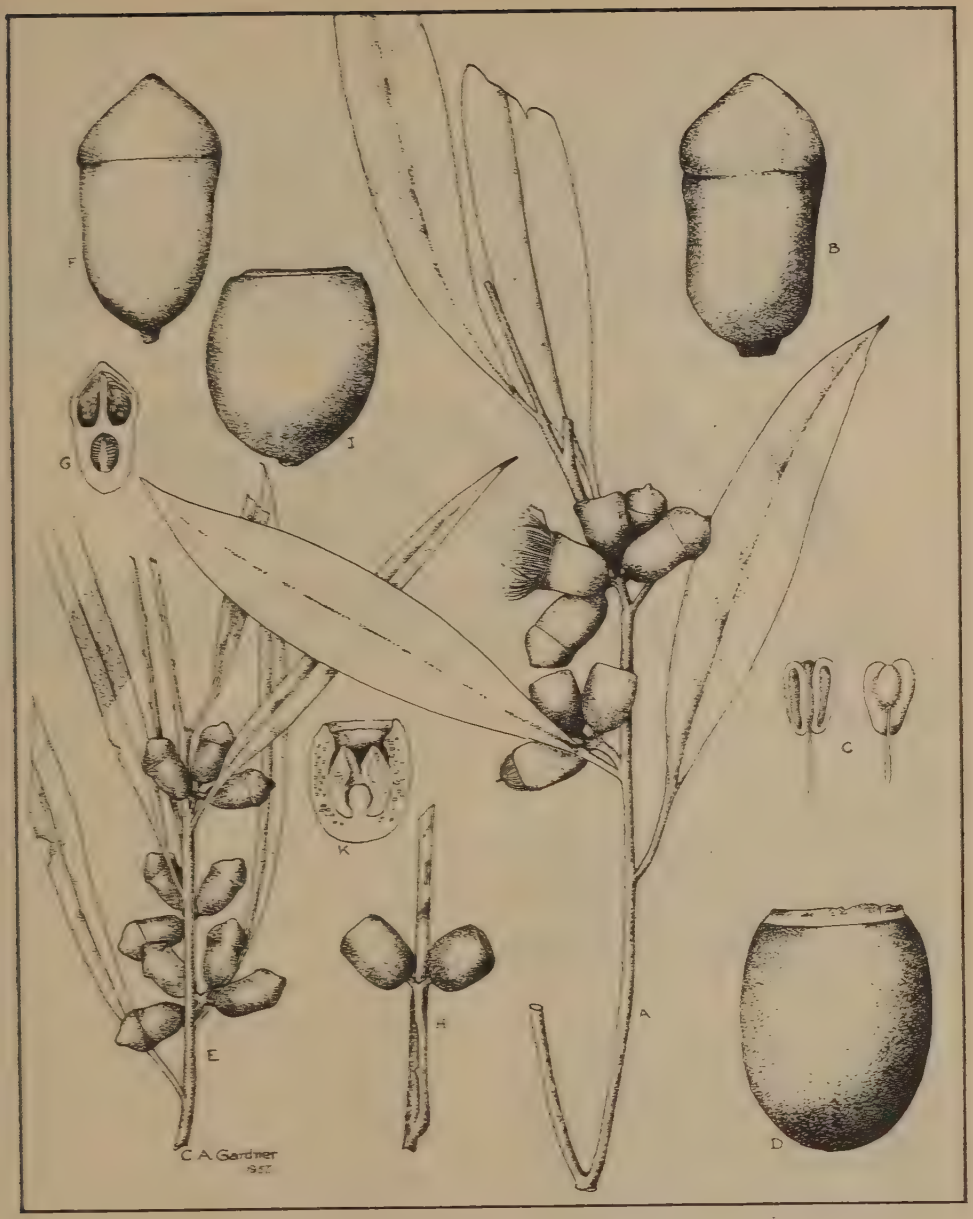
In May 1924, the writer discovered a mallee on the shores of a small salt lake near Grass Patch, which was named *Eucalyptus Merrickae* by Maiden and Blakely, and this proves to be no more than a form of *Eucalyptus scyphocalyx*. Since then it has been found in similar situations at Circle Valley, Grass Patch and East Dowak, while a variety of the species extends westward as far as Newdegate and South Kumminin, The Circle Valley and Grass Patch plants are densely-branched, widely-spreading mallees up to 10 ft. in height, with narrow leaves of a pale greyish or yellowish green, and a rough grey bark, which gives them a distinctive appearance. Apparently the plant is highly salt-tolerant. This form is illustrated in E to K. We know little concerning the variety, except that it is smooth-barked in the upper parts, and sometimes a small tree. It flowers in September.

THE APPLE MALLEE

*(Eucalyptus bupresti*um F. Muell.)

A—Branchlets with leaf and flower-buds; B—Leaf; C—Flower-buds taken from an umbel: D—Section of flower-bud; E—Anthers; F—Fruits; G—Fruits in section (note the free capsule); H—Seeds; I—Seedling; (C, D, E, G and H variously enlarged)

[icon origin.



THE GOBLET MALLEE

(Eucalyptus scyphocalyx [F. Muell.] Maiden et Blakely)

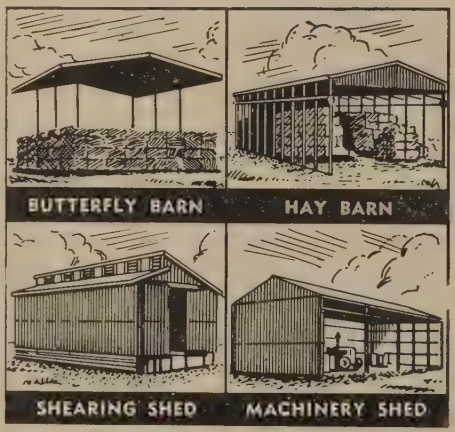
A-D—The type specimen from Eyre's Relief: A—Branchlet with buds and flowers; B—Flower-bud; C—Anthers (after Blackton); D—Fruit; E to K—The Grasspatch form: E—Branchlet with buds; F—Flower-bud; G—Flower-bud in section; H—Fruits; I—Fruit; K—Section of fruit (B, C, D, F, G and I variously enlarged)

[icon. origin.

BOUCHER

Low - cost BUILDINGS

for every agricultural and farm purpose



Need a Shearing Shed, Implement Shed, Hay Barn or General-Purpose Shed on your property? If you do, then a BOUCHER BUILDING is the answer to your problem. These buildings can be supplied quickly and economically to fit your particular project. Fill in the Coupon for full details.

Features that make Boucher Buildings so outstanding:

- **LEAN-TO'S can be added.**
- **TUBULAR STEEL COLUMNS used throughout for added strength.**
- **20 ft. SIDE OPENINGS.**
- **NO SIDE BRACING required.**
- **EXTENDABLE in sections.**

Manufactured in W.A. by:

BOUCHERS INDUSTRIES LIMITED

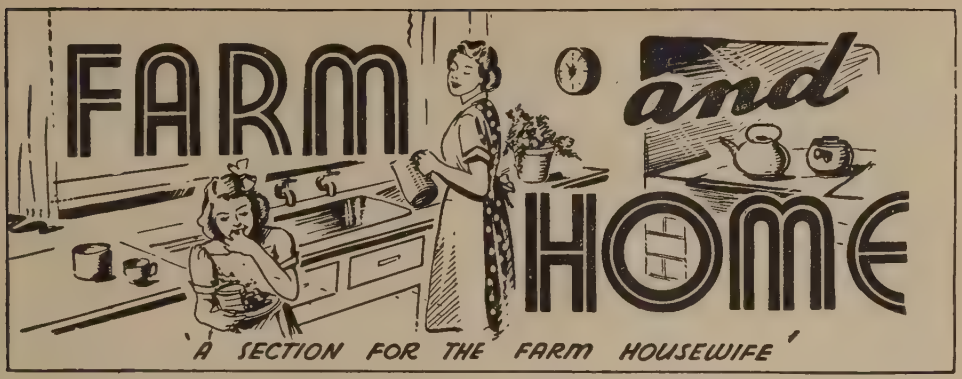
Scarborough Beach Road, Osborne Park. **Phone 24 1041**

POST THIS COUPON

To BOUCHERS INDUSTRIES LTD., Scarborough Beach Rd., Osborne Park. Please send me full details of your Steel Frame Buildings.

Name .....

Address .....



Renovate Last Season's Shoes

By HELEN M. GLOSTER

HAVE you a pair of worn leather shoes, perhaps a pair of gold or silver kid evening shoes that are "rubbed" on the surface? Here is good news for you! Your shoes may be renovated and made to look like a brand new pair by the application of a coat of "Leather Lacquer" which is now available in a wide range of colours including gold and silver.

This lacquer adheres so well that it cannot be softened by the usual paint thinners. It is advisable when buying, to buy also a bottle of lacquer thinner. This may be used for cleaning the hands and brushes, and for removing that odd spot of paint that settles in the wrong place. It is also quite a good idea to wear a pair of rubber gloves while applying the paint.

Requirements.

1 tin leather lacquer (available in ¼-pint sizes).

1 bottle of lacquer thinner .

A soft bristle paint brush (½ in. to ¾ in. wide).

Some white spirit or cleaning fluid.

Method.

Clean shoes thoroughly with white spirit. Pay *special attention* to any greasy spots.

Using the fingers, rub a little lacquer on very worn spots. This builds up a new surface.

Paint over the entire surface of the shoes with a coating of lacquer. Do not over-paint. You will find the lacquer levels out as it dries.

A second coat is seldom necessary. If it is, allow one hour between coats.

If sticky patches appear during painting these are due to grease or wax not removed when cleaning. These spots may be cleaned with a soft cloth soaked in spirit. A second coat of lacquer may be necessary in this instance.

N.B.—Do not use lacquer in wet or humid weather.

This lacquer is suitable for all leather and leather coated fabrics, worn leather, upholstery, etc. Try it on shoes, handbags, car and chair leather. You may even like a change of colour when renovating.

Plastic Coated Fabric.

Leather lacquer in not suitable for use on plastic materials.

A special lacquer is available for use on imitation leather made of plastic. A small portion should be tried on the fabric first to ensure that it dries satisfactorily.

SUKIYAKI

From Japan comes this tasty meat dish. It is a regular Japanese family dish. There are many versions. Here is a simple one:

Ingredients.

Lump of suet.
Thin slices of rump or fillet steak.
Leeks or onions.
Spinach.
Carrots (very thinly sliced).
Bean Curd (cut up).
Any other vegetables (if liked).
Soy sauce.
Sugar.
Sake, sweet wine or whisky (if liked).
Raw egg.
Hot water.

Method.

1. Grease frying pan or pot with lumps of suet.

Fry sliced onions, add soy sauce and hot water.

Add other vegetables and simmer slowly.

Vegetables that take longest to cook are added first. Leave vegetables in layers.

Add bean curd and cook a little.

Add sugar, wine.

Add steak (sliced very thinly) and cook, allowing meat to remain on *top* of other ingredients.

Just before serving, lift each piece of steak and dip into raw beaten egg. The heat of the meat will cook the egg.

Serve with rice.

This dish may also be made using chicken, pork or oysters.

N.B.—A more elaborate method of preparation of Sukiyaki will be given later.

It will be noticed that soy sauce and sugar appear frequently in Japanese meat dishes.

OYA KO DOMBURI

Oya means parent; Ko means child; Domburi—bowl. (Translation from Japanese.)

Ingredients.

Rice.
Stock.
Soy sauce.
Mushrooms.
Vegetables (carrots, beans, spinach).
A raw egg for each person.
Pickles.

Method.

Cook the rice and keep hot in a bowl.

Have stock, to which is added soy sauce, mushrooms and vegetables.

Cook until ingredients are tender.

Beat eggs and add to mixture just before serving. *Cook very gently.*

Serve mixture on top of rice.

Pickles may be served with the dish.

CHAWAN MUSHI

Chawan (is a small individual covered bowl).

Mushi (steamed).

The "chawan" may be improvised quite easily in any Australian kitchen by using small china, aluminium or enamel basins with covers.

Ingredients.

¾ pt. stock (from chicken or fish).
3 eggs for 2 people (or 1 egg per person).
Raw chicken, cut into *small* serving pieces.
Mushrooms.
Green beans, cut into small pieces.
Spinach (cut or broken).
Soy sauce.
Chestnuts (if available).

Method.

Beat eggs, stir in cold stock, add other ingredients, placing greens on top.

Steam in "chawan" standing in saucepan of water.

When cooked, this dish should be like a steamed or baked custard in consistency.

This dish is served with rice, vegetables, pickles. May also be served with broiled fish.

N.B.—There is nothing hard and fast about choice or quantities of many of the ingredients in these recipes.

HAMBURGERS

Ingredients.

4 or 8 rounds of bread for toast, *or*
4 bread rolls.
Butter.
1 lb. minced beef.
Salt, pepper to taste.
3 or 4 onions.
Little flour.
Frying fat.
Sauce—(tomato, worcester, barbecue)—optional.

Method.

Slice onions finely and fry until a golden brown.

While onions are cooking prepare the mince by adding seasoning and forming mince into four balls.

Using flour, flatten each ball until about 6 inches in diameter or until large enough to cover base of frying pan.

Remove onions.

Using egg slice lift a round of meat into the frying pan and fry quickly on each side.

Serve at once with onion on a slice of buttered toast or between two slices of toast or toasted roll.

Sauce may also be served if liked. Sufficient for 4 people.

A BOOK CARRIER

This book carrier made in crochet was designed to carry a prayer book measuring 5½ in. x 8 in. The thickness of the book was 1¼ in.

A pocket to hold purse or offering envelope was attached to the outside.

Directions given are for the bag (pictured).

If you wish to make a bag to hold a couple of library books or books of other dimensions measure up the books and make the bag large enough to hold them. The bag was made throughout in plain treble crochet. Pattern may be varied if a more elaborate bag is desired.

Materials Required.

3 oz. netting twine or fine macrume string.

No. 11 aero crochet hook (or similar hook).

Method—Main Part of Bag.

1. Make 47 chain.

2. Make 2 chain to form the first upright, then 46 treble stitches into each of the remaining chain stitches forming 47 upright stitches.

3. Next row. Turn, make two chain 46 treble.

4. Continue, repeating this row until work measures 12¼ in. (about 38 rows) end off.

Insets for Ends (2).

1. Commence with 37 chain.

2. Make 2 chain then 36 treble to make 37 upright stitches.

3. Repeat until 4 rows have been completed.

Insert the ends by pinning into position and joining with double crochet.

Handles.

Make about 8 in. long (47 chain).

Work three rows of treble.

Double over and double crochet edges together to make a firm handle.

Pocket.

About 5½ inches (37 chain).

Work 12 rows of treble (2 chain 36 treble).

To Make Up.

Sew on handles and pockets; sew in the loose ends of twine.

N.B.—It is advisable when making chain stitches, to work a few extra in case the tension is tighter than the model. Work to measurements in preference to number of stitches. If you have too many chain stitches they may be unpicked quite easily.

ONE STOP SHOPPING

make MIDLAND your centre

Sell to and Buy from

W.A. PRODUCE CO.

the convenient store
in Central Midland

6 GREAT NORTHERN HIGHWAY

TERMITES OR WHITE ANTS

By C. F. H. JENKINS, M.A., Government Entomologist

TERMITES are commonly but erroneously called "white ants." Actually they are more nearly related to cockroaches than to ants, but their general appearance and subterranean habits have given strong support to the popular designation. They may be divided into two major groups from an economic point of view, viz., wood-dwelling and earth-dwelling termites.

The **wood-dwellers** enter wood directly from the air, and often the colony is wholly confined to the particular piece of timber in which it is working, but with the earth-dwellers the conditions are somewhat different.

Earth-dwelling termites destroy wood by attacking it from the ground or from another piece of timber in contact. The main colony is situated underground and they often build tubes or covered runways from the ground over wood, bricks, plaster, etc., to wood at higher levels. It is to this earth-dwelling group of termites that the principal economic species in Australia belong and consequently it is against them that our control measures are levelled.

LIFE HISTORY

Like ants and bees, the termites are social insects with specially developed types or castes. Again, as in the case of ants and bees, the vast majority of individuals are **workers** which have the duties of food getting, construction and care of the young. A small percentage of individuals have their jaws greatly enlarged, not for gnawing wood, but to serve as weapons, and these large-headed, strong-jawed members of the community are termed **soldiers.** When a gallery wall is breached by an enemy, it is the soldiers' duty to protect the colony until the damage has been repaired by the workers. In some of the higher groups of termites a different type of soldier is met with. The jaws are very poorly developed, but the fore-part of the head is produced into a prominence or rostrum, and a corrosive milky fluid is exuded from a pore at the apex. This fluid serves as a very effective weapon of defence, and being acid in nature, is responsible for the etching of metals traversed by termites, and makes the penetration of lime and mortar possible. This particular type of soldier is known as a nasute soldier.

The **Royal pair** are solely interested in perpetuating the race and although when first starting a colony they have a multitude of duties to attend to, after the first brood of young has developed, the queen assumes massive proportions, and becomes little more than an animated egg-laying machine.

The swarming of termites has been observed by everyone. This is merely the emergence of the winged males and

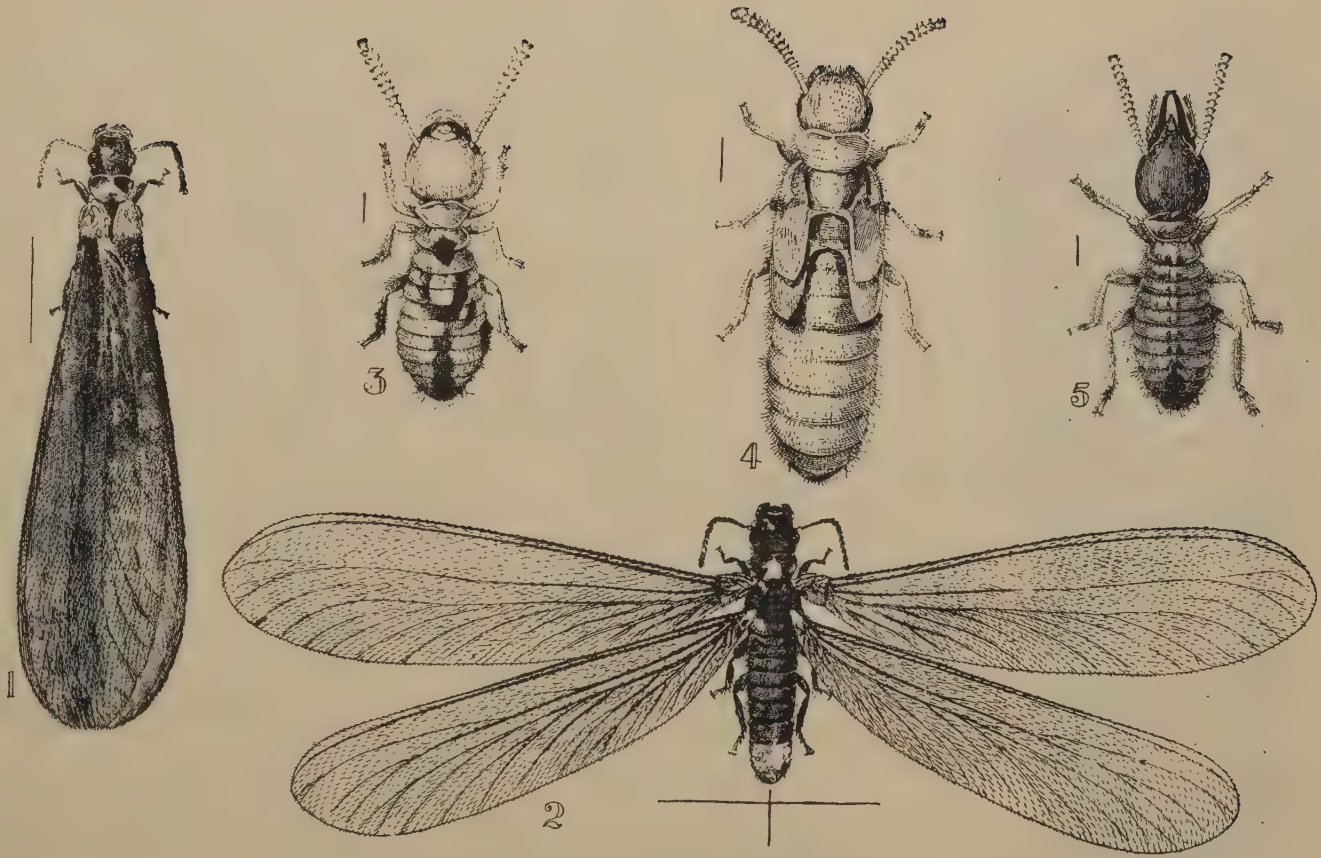


Fig. I—1 and 2, Male and Female Winged Termites; 3, Worker; 4, Nymph; 5, Soldier
(After Froggatt)

females preparatory to forming new colonies. Warm, humid weather is usually chosen for the flight which is only of short duration. The wings are then shed, pairing takes place, and the couple burrow into the soil near some log or stump to commence the task of founding a new colony.

Termites react negatively to light, and so will only work in the dark. They are also very sensitive to desiccation and thrive best in a humid atmosphere. Both these facts are important in considering some of the control measures recommended.

PREVENTIVE AND CONTROL METHODS

Resistant Timber.

All timbers are not equally attractive to termites, and consequently where possible termite-resistant timber such as Jarrah (*Eucalyptus marginata*), Native Pine (*Callitris spp.*) and Jam (*Acacia acuminata*) should be used for building or fencing.

Treatment of Timber.

Coal-tar creosote has been found the most effective medium with which to treat timber against termite attack.

The immunity obtained varies according to the method of treatment and the degree of penetration of the chemical. The *Pressure Process* is the most effective but as the timber is subjected to vacuum treatment, it is not applicable to general usage, and need not be enlarged upon here.

The *Open Tank Process*, which merely involves dipping timber likely to be buried or in contact with the soil, is a method which is readily usable. If the creosote is heated and the timber allowed to steep for some hours until the mixture has cooled down, a better penetration will result than from a cold dip, but even the painting or spraying of timber, especially if several times repeated, will give protection.

METHODS OF TERMITE-PROOF CONSTRUCTION*

"There is no easy method of eradicating termites once established in a building. Measures taken during planning and construction are the best means of dealing with the problem. Experience in the use of ant-caps or shields has shown that they give excellent results when properly made and fitted; where termites gain entry in spite of caps or shields, failure is almost invariably due to incomplete protection or poor workmanship.

"A bent-over sheet of metal can prevent termites constructing their galleries from a stump or a wall onto constructional timber. Metal turned down at an angle of 45° requires termites to construct a downward gallery and negotiate the edge in order to pass; for some reason termites are very seldom able to do this.

Termite Shields and Caps.

"Building of concrete, brick, brick veneer, or timber should be fitted with shields or caps thus:—

(i) The shield should be constructed of 24- or 26-gauge galvanised iron or copper, and the outer edges should project at least 2 in. from the wall or stump on which the shield is placed.

(ii) Shields should be stamped out, but if cut from sheet metal all joints should be mitred and soldered.

(iii) The shield or cap should project horizontally from the top of the wall or the stump for at least ½ in. and should then turn down at 45° for another 2 in.

(iv) Where strip-shields are used, or where shields join at wall junctions, all joints should be soldered with a lap of 1 in.

(v) Galvanised iron shields should be laid on a damp-proof course. Sheet copper can be arranged to serve both as ant-capping and damp-proof course.

Site Clearance.

Debris, mortar, or timber should not be left under a building to provide access over the metal shield to the timbers above. Wood should be removed from under fireplaces, steps, terraces, or porches, where an earth or a concrete fill is used."

* This extract is taken from a leaflet entitled "The Science of Building" and published by the Division of Forest Products, C.S.I.R.O., Melbourne.

Crawl Space—Ventilation and Inspection.

In the case of suspended timber floors there should be a minimum of 18 in. between the beams and joists to allow sufficient space for regular inspection. Access should be provided for in the construction. The termite activity can be minimised by providing adequate drainage and cross-ventilation and thus keeping moisture level to a minimum.

Protective Barriers.

The most effective chemical barriers are those applied before the foundations are laid. The total area of the ground in contact with the building can at this stage be treated easily with long-lasting insecticides. The bottom and sides of the foundation trenches should be thoroughly wetted with insecticide. As an additional precaution the whole of the ground surface beneath the building may be treated by raking and spraying so as to wet 2 to 3 in. of soil, using about one gallon of liquid to ten square feet. This is particularly advisable where "on the ground" concrete slab floors are used. Dieldrin at 0.5 per cent. or Chlordane at 2 per cent. are both very effective in this way and may give protection for many years.

Precautionary Measures for Existing Buildings.

Protection for up to ten years and perhaps longer can be obtained by the trench method. A narrow trench about 6 to 12 in. deep should be dug in contact with the inside edge of the building foundation and piers. The soil should then be replaced, during which process it is sprayed or watered with 2 per cent. Chlordane or ½ per cent. Dieldrin so that the insecticide is thoroughly mixed with the soil. Where no access to the inner foundations is possible the trench should be constructed around the exterior of the building. The suggested rate of treatment is two gallons of liquid to every five feet of trench.

Control.

When termites are known to be working in a building, the most effective control will be obtained by the use of poisonous dusts. White arsenic, or Paris green may be used.

The method of application is to bore holes into the infested timber or gently prise open a crack with a knife or screwdriver and puff into the galleries a small quantity of the dust, using a small rubber powder-blower or a dust-gun. Treatment should be given at a number of different places according to the extent of the infestation, and the bore holes and cracks should be carefully sealed or pasted over. This latter is essential, for if the holes are covered the insects will continue to use the treated galleries, but if the holes are left open to admit the light the termites will block off the damaged galleries and desert them, only to carry on work elsewhere.

The amount of dust to be injected will vary according to the size of the timber being treated, but one ounce should be enough for about 20 or 30 holes. The main essential is to introduce the dust into the termite galleries while causing as little disturbance to the insects as possible. The termites themselves, by running backwards and forwards over the dust will be the main factor in ensuring its wide distribution. Death is caused by the insects grooming and cleaning themselves and one another, and so swallowing some of the poison.

These poisonous dusts will only prove effective when finely ground and when used in dry situations as moisture soon clogs and cakes them.

A suitable type of dust injector is the "de Vilbiss 119 powder blower." Blowers in which the rubber bulb serves as a reservoir for the dust are less satisfactory as they may administer too much dust at one time and so completely block the termite galleries.

After treating the timber it should be left undisturbed for a month or more, in order that the dust may take effect, then any very badly damaged parts may be replaced.

Where possible the nest should be located and dug up. It may be under the house or many yards away, but it should be treated by drenching with creosote and similarly the ground around any "doubtful" parts could be saturated with creosote, dieldrin or chlordane.

Fruit Trees and Garden Plants.

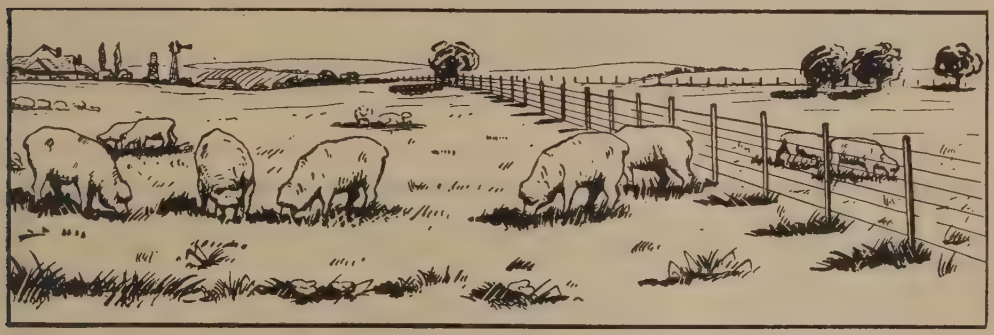
The requirements for controlling termites in fruit or flower gardens and buildings are fundamentally the same. In

clearing the land preparatory to planting, care should be taken to remove all stumps and timber liable to harbour the pest. Avoid injuring the trees as much as possible, as dead roots or scars near the ground induce attack. Badly infested trees should be removed, but the poison dust treatment has often been used to save trees and vines not too far gone.

Holes should be bored into the infested portion of the trunk just above ground level and in such a manner as to enable dust to be blown into the actual termite galleries. As in the case of structural timber all bore holes should be sealed with grafting wax or some other suitable material. Where the roots of plants are attacked, the use of a fumigant such as Paradichlorobenzene is suggested. A trench three or four inches deep should be dug about six or nine inches from the base of the plant and scattered with two ounces of fumigant. After filling in, the gas will gradually disseminate into the soil. This treatment will be more effective when the soil is warm. The liberal use of water mixtures of dieldrin and chlordane for the purpose of impregnating soil around young trees should also give protection. The water mixtures should be similar to those recommended for treating house foundations.

Poison Baits.

There is no evidence to suggest that effective control of termites can be obtained with poison baits, and their use is not recommended.



WHITEWASH RECIPES

A formula said to be used by the United States Government for the famous White House, and for lighthouses and other public buildings is given below. This is said to be a particularly hard-wearing mixture.

Unslaked lime, ½ bushel.

Common salt, ¼ bushel.

Ground rice, 3 lb.

Whiting, ½ lb.

Glue, 1 lb.

Water, a sufficient quantity.

Slake the lime in a vessel of about 10 gallons capacity; cover it, strain and add the salt previously dissolved in warm water. Boil the rice in water; soak the glue in water and dissolve in a water bath and add both, together with the whiting and 5 gallons of hot water, to the mixture, stirring all well together. Cover to protect from dirt, and let it stand for a few days, when it will be ready for use. It is to be applied hot, and for that reason should be used from a kettle over a portable furnace.

Insoluble

Dissolve 2 lb. of ordinary glue in 7 pints of water. When dissolved add 6 oz. of bichromate of potassium dissolved in a pint of hot water. Stir the mixture well, adding sufficient slaked lime to make up to the usual consistency and apply with a whitewash brush as quickly as possible.

This dries in a short time and by the action of light, becomes converted into an insoluble waterproof substance which does not wash off easily, even in hot water. It may be coloured to any desired shade by the use of aniline dye or powered colouring.

The wall should be wet and cleaned with fresh water, followed by the immediate application of the whitewash.

RAILWAY SHEEP VANS
PROTECT YOUR SHEEP

★ Railway Sheep Vans are fully roofed and each deck is double-floored and specially drained, thus ensuring dry stain-proof transit.

★ Experiments at the Glenfield Veterinary Research Station, N.S.W., have proved that foot-rot is not transmitted by railway sheep vans.

Obtain BETTER PRICES For Your Stock and Skins . . . Consign Your Livestock By Rail

WESTERN AUSTRALIAN GOVERNMENT RAILWAYS

LIFTING JACKS FOR EVERY PURPOSE

by

TREWHELLA Bros. Pty. Ltd.

TRENTHAM, VICTORIA

6 Tons Capacity Rack and Pinion Jack.

35 Tons Capacity Ball Bearing Screw Jack (Short Lift), also Other Types and Sizes.

30 Tons Capacity Ball Bearing Screw Jack. 15 inch Rise.

Available from

McLean Bros. & Rigg **McPhersons Ltd.** **The Bairds Coy. Ltd.**
Harris Scarfe & Sandovers Ltd. **J. & W. Bateman Ltd.**
Co-operative Wholesale Services Ltd.

● F. C. WILKINSON, B.V.Sc.,

answers some questions concerning

PIG-POX

Its presence in W.A. is suspected but not yet confirmed

A young pig showing scab formation resulting from pig-pox.

A PIG-FARMER recently asked for information on pig-pox and inquired whether the disease occurs in Western Australia. The first part of the question is easily answered, as pig-pox is a typical pox disease caused by a virus and resulting in roundish, red areas appearing on the pig's skin. The disease is in fact very similar to the other more commonly known pox diseases—chicken-pox in the human population, fowl-pox in poultry and cow-pox in cattle. The characteristic red patches which appear are followed by a scab formation with healing two or three weeks after the first signs of the disease have been seen.

As to the question, does the disease occur in pigs in Western Australia, this has not been confirmed. During the last 12 months, three properties have been visited where some of the pigs have shown typical symptoms of pig-pox, but laboratory attempts to prove the disease was pig-pox, by trying to artificially infect other pigs, were not successful.

The typical pig-pox seen in Australia is not a severe disease. It mainly affects young pigs from soon after birth until weaning, but occasionally cases are seen in older pigs, from weaner to baconer weight. The disease is spread from pig to pig in a herd by biting insects such as lice, mosquitoes and fleas. Several days after the insect has infected the pig, raised red areas develop on parts of the skin where it is thin and has little hair covering, that is along the belly, under the jaw and inside the legs. In bad cases the lesions extend up along the sides of the pig and the pig may be off food and feverish for one or two days.

The early reddening stage is followed by some weeping of the reddened areas and then the formation of a scab. This scab remains for about three weeks and then drops off, leaving the skin free of blemishes.

The disease can run quickly through all the young pigs in the piggery but it causes very little damage in well-cared-for pigs apart from a very slight check in growth rate. Death due to pig-pox is rare but if

other diseases such as paratyphoid or pig pneumonia occur at the same time, then death rates can be high.

Treatment is of little effect and is really a waste of time as healing of the pox sores cannot be hastened to any great extent. If left untreated the sores heal in about two or three weeks.

If the disease is seen in your pigs then you can try to prevent the spread of the disease by segregating the affected animals and treating all the pigs on the property to eradicate lice.

To summarise, pig-pox is a somewhat minor disease of pigs, which is thought to occur in pigs in Western Australia, but its presence has not been proved. The disease can easily be recognised by the owner who should not be unduly worried because if the affected pigs are kept well housed and fed, no deaths should occur and the set-back to the pigs' growth will be slight.

If any pig-owner living in or near Perth sees the disease in his pigs, it would be appreciated if he could inform the Veterinary Branch of the Department of Agriculture. We can then obtain some material which might help us to definitely establish that the disease is present in Western Australia.

KEEP YOUR JOURNALS

HERE at the production end, we are sparing neither expense nor effort in making the "Journal of Agriculture" a publication which will help you in your farming operations.

We suggest that the Journal is worth keeping and that a year's issue will make an attractive and useful volume for your library—a volume that is full of sound factual information, attractively presented.

Arrangements have been made for the compilation of a comprehensive index to be incorporated in the December issue—a feature which will greatly enhance the value of the Journal as a work of reference.

SHADE AND SHELTER

The farm homestead where some of the natural trees have been preserved, or where introduced varieties have been planted according to a pre-conceived plan, has a much more attractive appearance than one which is sited on a bare, sunburnt, windswept spot affording little protection to either man or beast.

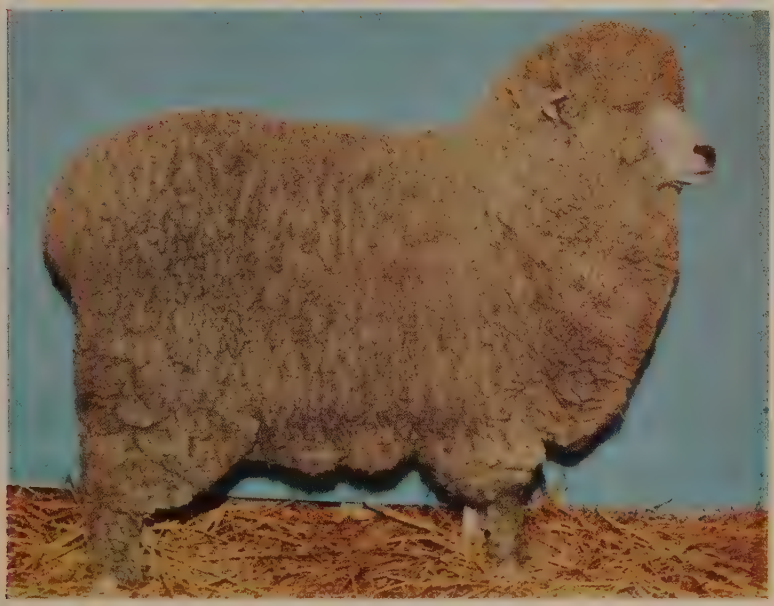
The man who owns stock should realise the value of shade and shelter. A rough, sandy patch covered with scrubby trees will often provide a greater return if left intact than it would if cleared and laid down to pasture.

So many of us too, are prone to follow the example handed down from early generations of selecting the top of the highest hill on the property on which to build. This was sound practice in the olden days when castles were elevated in order to gain knowledge of the approach of the enemy; but today, the greatest enemies of the stockowner are the cold wind and rain of winter and excessive heat in the summer. Therefore when clearing a new property and choosing a site for the house and farm buildings, advantage should be taken of existing shelter in the form of hills and standing timber, while providing also that the breezes of summer are not excluded.

Trees in the right places are valuable on a farm; they provide shade and shelter belts for stock and shelter for crops; on the windward side of open dams they considerably reduce evaporation; they prevent erosion on hillsides and river banks, and they enhance the appearance of the property, thereby increasing its value as a selling proposition.

Where a clean sweep has been made in the original clearing, replanting is necessary, and as the trees are required to provide shade in summer and windbreak in winter, evergreens are the most suitable.

T. H. Anderson's Champion Corriedale ram at the 1959 Perth Royal Show



V. F. Pederick & Co.'s Champion Corriedale ewe at the 1959 Perth Royal Show

Famous Sheep Breeds

2.—THE CORRIEDALE

by

J. A. MALLETT

THE Corriedale sheep is a breed which has achieved widespread popularity throughout the world as a dual-purpose animal. It was evolved by New Zealand breeders who—not fully satisfied with the performance of either the Merino or the British longwool sheep under their conditions—sought an animal which would combine the superlative wool-producing properties, and outstanding foraging ability of the Merino with the better meat production and better mothering qualities of the British sheep.

Despite the multiplicity of sheep breeds throughout the world—Great Britain alone has about 30 recognised pedigree breeds—the existing strains are still inadequate to meet the widely-differing requirements of sheepmen in many countries, and cross-breeding is widely practised.

From time to time, progressive breeders have attempted to "fix" a cross-bred strain or in other words have attempted to create a new breed by a fusion of two or more breeds.

Increased knowledge of the science of genetics—the mechanism of inheritance—has greatly simplified this task in recent years, but most of our existing "pure-bred" strains were evolved from miscellaneous collections of ancestors long before the discoveries of Mendel were publicised. Breeders bred to an "ideal," mating the individuals which most closely approached that ideal, and rigorously culling progeny which failed to achieve the required standards.

By following these principles, the originators of the Corriedale breed successfully evolved an "inbred half-bred" which is perhaps the world's best example of a truly dual-purpose sheep.

HISTORY

The breed originated almost a century ago—in the 1860's—soon after Mr. James Little arrived in New Zealand from Scotland with a consignment of British longwool rams and ewes for Dr. Webster and Mr. Aitken who owned properties in North Otago.

He stayed in New Zealand to manage a property named "Corriedale" for Dr. Webster and it was there that he conceived the idea of establishing an inbred half-bred flock which would combine the best qualities of the Merino and the British sheep.

There seems to be considerable doubt as to the precise breed of the British sheep imported by Dr. Webster. Most writers simply refer to them as Longwools, using the capital letter. Britain has a Devon Longwool breed, so-called to distinguish it from the Devon Closewool but Dr. Webster's sheep may have been Lincolns, Leicesters or any other of the longwoolled, as distinct from the shortwoolled British breeds.

James Little named his new breed "Corriedale," after the title of the property, but on the death of Dr. Webster

Fig. 1.—A typical Corriedale sire

the estate was sold and the flock dispersed. Although Little continued the work in 1878 on a property he acquired in North Canterbury, a large-scale breeding programme had already been commenced on similar lines about four years earlier.

In 1874, Mr. W. S. Davidson, the manager of the New Zealand and Australian Land Company—the largest pastoral company in the world—had mated 1,000 stud Merino ewes with selected stud Lincoln rams on "The Levels Estate" in South Canterbury. The original parents were bred from each year for some years, the female progeny being heavily culled again and again.

Eventually they were mated to the pick of the half-bred rams and continued to be inbred for generation after generation.

Other flock owners followed suit using English Leicester, Border Leicester and Lincolns but "The Levels" flock is the oldest in New Zealand.

Eventually Corriedales were admitted to the New Zealand flock book, the regulations governing entry at that time not specifying any particular longwool breed, but merely that the sheep were the progeny of half-bred rams from half-bred ewes and the result of not less than 15 years of inbreeding, the original stock being the progeny of Merino and longwool sheep of any pure breed.

The Lincoln cross soon swamped all the other strains however and has come to be accepted as the true Corriedale. For many years the breed had to contend with prejudices, engendered in many cases by unscrupulous breeders who sold crossbred sheep as Corriedales. As a result of this there was often a wide variation in wool types among sheep which were all classed as Corriedales.

Today, thanks to some excellent work by the breed societies, the Corriedale has overcome all the early prejudices and has made tremendous progress during the last 20 or 30 years. Large consignments have been exported to North and South America, Japan, South Africa and many other countries. There are two Corriedale breed societies in the U.S.A., where this splendid sheep has many adherents.

Incidentally, it interesting to note that U.S. breeders made a parallel attempt to evolve a new breed by crossing Cotswold

Fig. 2.—The Corriedale's meaty conformation is well illustrated in this photograph of shorn rams

and Lincoln rams with Merino ewes of the Rambouillet strain, and inbreeding and culling the progeny. The idea was to evolve a sheep better suited to range conditions in the north-western states. The Americans called their new breed the Columbia and it is reported to be gaining rapidly in popular favour.

The Australian Corriedale Association was formed in Melbourne in 1914 and has done some splendid work on behalf of the breed in this country.

POINTS

The following standards of type are recognised by the Australian Corriedale Association:—

General Appearance.—The Corriedale should at once give the impression of being a well-woolled and evenly-balanced sheep, with a remarkably hardy constitution, the ram being of distinctive character and bold outlook. Being a dual-purpose sheep, consideration should be given to both wool and carcass.

Head.—Hornless, broad, strong, well-woolled, but free from wool blindness. Blue or black spots on ears are no defect but black or brown spots on hair or wool are defects. Wide-open nostrils, black preferable.

Neck.—Broad and strong, forming a good scrag.

Back.—From neck to rump, long, level and broad.

Brisket.—Deep and wide.

Ribs.—Well sprung and deep.

Hindquarters.—Well apart, deep and broad, and well let down towards hocks.

Legs.—Moderate length, with good bone, set straight and well apart. Black markings on wool or hair are defects. Brown markings on wool or hair are to be considered serious defects. Hoofs of fair size, well formed, and black in colour preferred.

Wool.—The Corriedale should carry a heavy, even fleece of good length, dense staple, pronounced crimp and even tip. The object quality is a long-stapled, dense, bulky 50's to 56's, but a somewhat lower

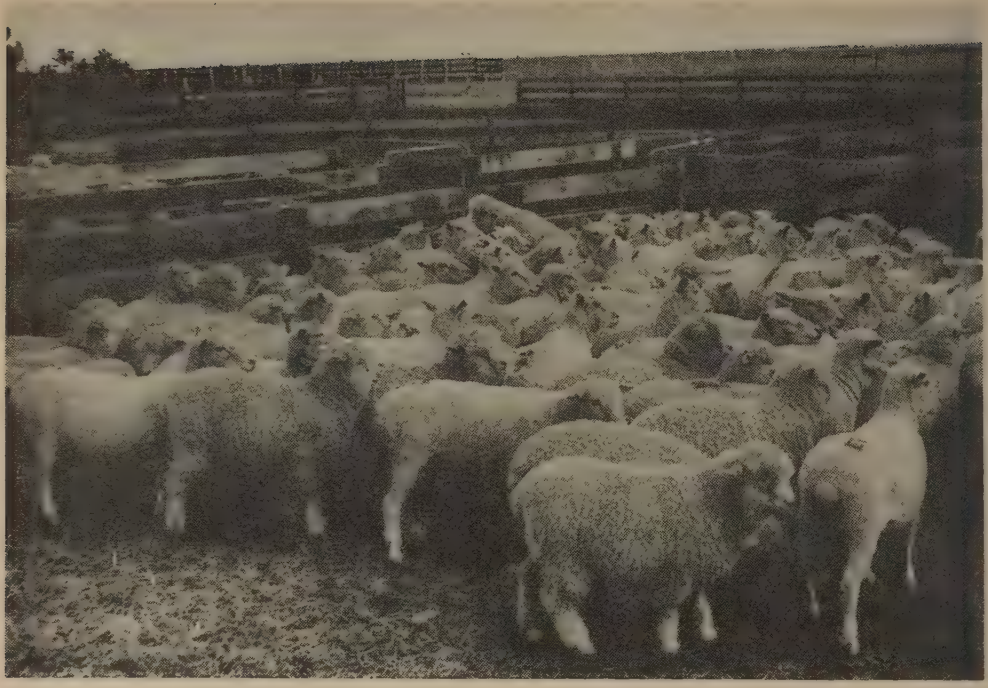


Fig. 3.—Corriedale ewes and lambs at the Esperance Plains Research Station

spinning grade, especially in a ram, is not to be discriminated against. A characteristic of the pure Corriedale sheep is the remarkable evenness in the length, density and quality of the fleece throughout. In the males the purse should be covered with wool not too coarse or hairy in texture.

DUAL-PURPOSE

From the foregoing it will be seen that the breeders' aims have been to produce a sheep that will grow a valuable fleece, with both weight and quality, on a carcass which meets the needs of the butchers and consumers. Pure Corriedale lambs have commanded good prices and when Corriedale ewes are mated to Downs rams a good export lamb may be obtained.

The Corriedale crosses well with other longwool breeds and is widely used on Merino ewes to produce a good type of comeback wool of 58/60 quality. Corriedale ewes produce a high percentage of twins and are good milkers and mothers.

FARMERS

This is YOUR Journal, and it has been written, edited and presented in a sincere endeavour to give you helpful information in an interesting manner.

We would like to have your views on the Journal—to know whether you like it or whether you don't. Drop a line to the editor and tell him the features you like and don't like in this issue—or the features you hope to see in future issues.

Sunbeam

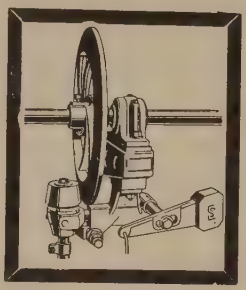
the first entirely
NEW MACHINE
in over 25 years!

New type oil seal saves 30% to 40% wear and tear
Reduces friction, eliminates continuous re-oiling
Runs cooler, feels cooler, fits hand better

TRADE IN THOSE OLD HANDPIECES NOW!

Made in Australia by Sunbeam Corporation Limited
(Formerly Cooper Engineering Co. Pty. Ltd.)

. . . . . and NOW the NEW Sunbeam Cooper SHEAR-POWER



Yet another first scored by Sunbeam! Now Sunbeam Cooper has positively taken the "bounce" out of shearing with the first completely new overhead gear in 27 years.

New Shear-power drive gives a smooth transmission such as you have never experienced before in shearing gear. There's no vibration—no hesitation—as you go into gear, Shear-power springs into full-powered life and your're shearing with an ease and smoothness you would not believe possible. All the famous features of "Master-Model" gear are here plus many more.

We'll be happy to give you full details right now.

Inquire through your local Sandovers Sunbeam Cooper Agent
or write direct to

SANDOVERS

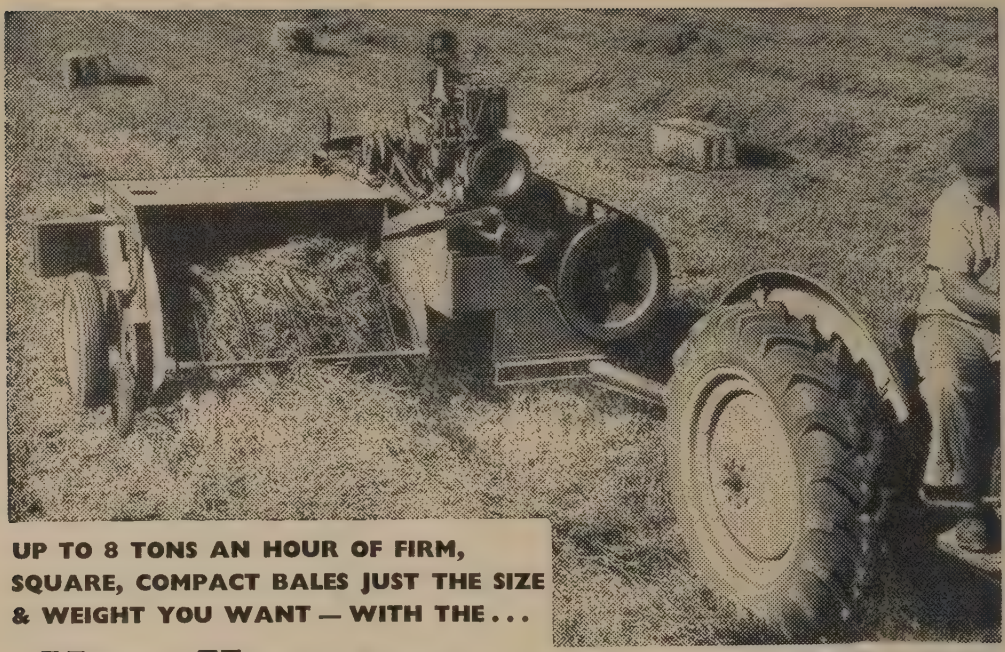
HAY STREET . . . . . PERTH

Honey Flora Calendar for March

COMPILED BY A. R. COLEMAN, APICULTURAL SECTION, WITH ASSISTANCE FROM THE BOTANICAL BRANCH

Common Name	Botanical Name	Where Found	Honey		Quality of Pollen	Remarks	Current Situation
			Quality	Quantity			
Hooked Mallee	*Eucalyptus uncinata* Turcz	Mallee areas	Very little known in W.A. : Vic. and S.A. regard it as excellent	Good in S.A. and Vic.	Good in S.A and Vic.	Not worked enough in W.A. to have any reliable reports	No reports
Blackbutt	*E. patens* Benth.	Found in place of Marri in some associations Manjimup to Bindoon	Good	Good	Good	Buds and flowers same year. Collie and Balingup best stands	Budded at the time of going to press
Powderbark Wandoo	*E. accedens* W. V. Fitzg.	Occurs on the eastern side of main heavy rainfall areas mainly on the ironstone ridges	Good, first quality....	Heavy medium	Excellent	Powderbark can be differentiated from Wandoo, by the powdery bark and from the fact that in early winter the bark has a salmon colour. Starts to flower at the end of January, and invariably shed some mature buds just before flowering. This does not seem to lessen the crop of honey. Buds are held for three years, much the same as Wandoo	Should be good in areas where heavy rains fell in winter 1957
Morrel	*E. oleosa* F. Muell, Var. *longicornis*	Wheat belt area	Good	Uncertain but a few local reports said good yields obtained	Good	A tall tree on good soil, widely scattered and difficult to find enough trees to work as a flow. Could be tried when nothing else available. No information on buds	No reports
White Gum or *Wandoo*	*E. redunca* Schau Var. *elata*	Winter - flowering Wandoo ; found from Chittering North to Moora	Excellent	Excellent	Excellent	Tends to be found in the valleys. Major honey plant	No budding reported

Karri	*E. diversicolor* F. Muell.	Donnelly Mills, Pemberton, Shannon Mill area	Choice	Heavy	Poor	Karri flowers in this area, over 12 months but the major flow is mid-December, to the end of April. Flowering cycles are apparently tied up with maturing fruit on trees, winter rains to induce growth, and temperate weather in summer when the very small buds are present. Buds from growth of young tips to flower take three years	In production in the Donnelly River Mill
Marri	*E. calophylla* R.BR.	Enneabba, south to east of Albany	Excellent	Excellent	Excellent	Major honey plant, very sensitive to climate	Could be good if the nights are moist
Red Tingle	*E. Jacksonii* Maiden	Southern rain-forest. Denmark	Excellent	Excellent	Excellent	Not big enough stands	No reports
Tuart	*E gomphocephala* D. C.	Moore River-Busselton	Very good	Good	? Poor	Buds often eaten by borer. Seldom flowers	No reports. Could be flowering in the Busselton-Mandurah area
Sugar Gum	*Eucalyptus cladocalyx*	Not a native of W.A., but used as a street tree	Good	Heavy	Good	As this tree is planted extensively in some towns the local beekeepers get a good crop. Buds believed to be one year old at flowering	As this tree flowers every year, it should be investigated by beekeepers in areas where it is planted
White Heath	*Leucopogon propinquus* R. Br.	Widespread	Good	Good	Good	Important when in dense stands	This should be good if we have rains in March
Rottnest Tea Tree	*Melaleuca pubescens*	Rottnest, Cape Naturaliste and Dongara only	Poor	Good	Good	Only three stands known	Should be a good year
One-sided Bottlebrush	*Calothamnus sanguineus* Lahill	Widespread, seems to like rocky slopes either lime or ironstone	Dark, good quality	Excellent	Good	Flowers over a long period	Look for the flow of this plant on the rock, gravelly outcrops on the edge of the Darling Range



UP TO 8 TONS AN HOUR OF FIRM, SQUARE, COMPACT BALES JUST THE SIZE & WEIGHT YOU WANT — WITH THE . . .

NEW HOLLAND SUPER 66

Husky, Labour-saving, Performance-proven and Profit-making!

PLUS these additional advantages!

HIGH QUALITY HAY ALL THE WAY . . . ***up to 8 tons an hour*** in one sweep from free-floating pick-up to large feed chamber where it's pre-folded . . . an ***exclusive*** feature that gives you steady high output in light or heavy windrows.

PRECISION KNOTTERS tie ***safely*** and ***securely.*** Mounted on top where they're easy to get at. Four-notch twine disc assures steady baling ***without a miss.*** Your bales stay even with rough handling.

METERMATIC BALE CONTROL lets you change bale ***length and weight*** in seconds . . . from 12 to 52 inches for just the weight you want. Each bale is measured from zero, ensuring greater uniformity in length.

FULL FLOATING PICK-UP. Rubber tyre pick-up wheel keeps spring teeth ***uniformly close to ground.*** In low spots and over ridges "SUPER 66" safely whisks hay into pick-up. Raised windguards and flared sides let pick-up handle big windrows ***at high speeds.***

SMOOTH BALING is ensured by the ***exclusive*** New Holland pre-compression which gives a square compact bale with all the vital leaves ***sealed inside*** each bale.

OVER-RUNNING CLUTCH on P.T.O. Model ***flywheel keeps right on spinning*** when you slow down or stop your tractor. Protects tractor gears, lets you change gears on the go.

SUPER 66 — E/F & PTO MODELS

NEW HOLLAND

"First in Grassland Farming"

New Holland (Australasia) Pty. Ltd.
(DIVISION OF SPERRY-RAND CORPORATION U.S.A.)

Head Office : 232 Princes Highway, Dandenong, Vic. (D'nong 540)

W.A. Branch : Albany Hwy., Cannington, Perth (68-2828)

Branches also at Brisbane, Sydney and Adelaide.

(9JL10857/8W)

MODEL 55 "ROLABAR" RAKE

For straight, even, quick-drying windrows. Uniform corners. Faster, cleaner baler pick-up.

The GERALDTON Strain of Subterranean Clover

By A. J. MILLINGTON, D.Sc. (Agric.), Reader in Agronomy, Institute of Agriculture, University of Western Australia

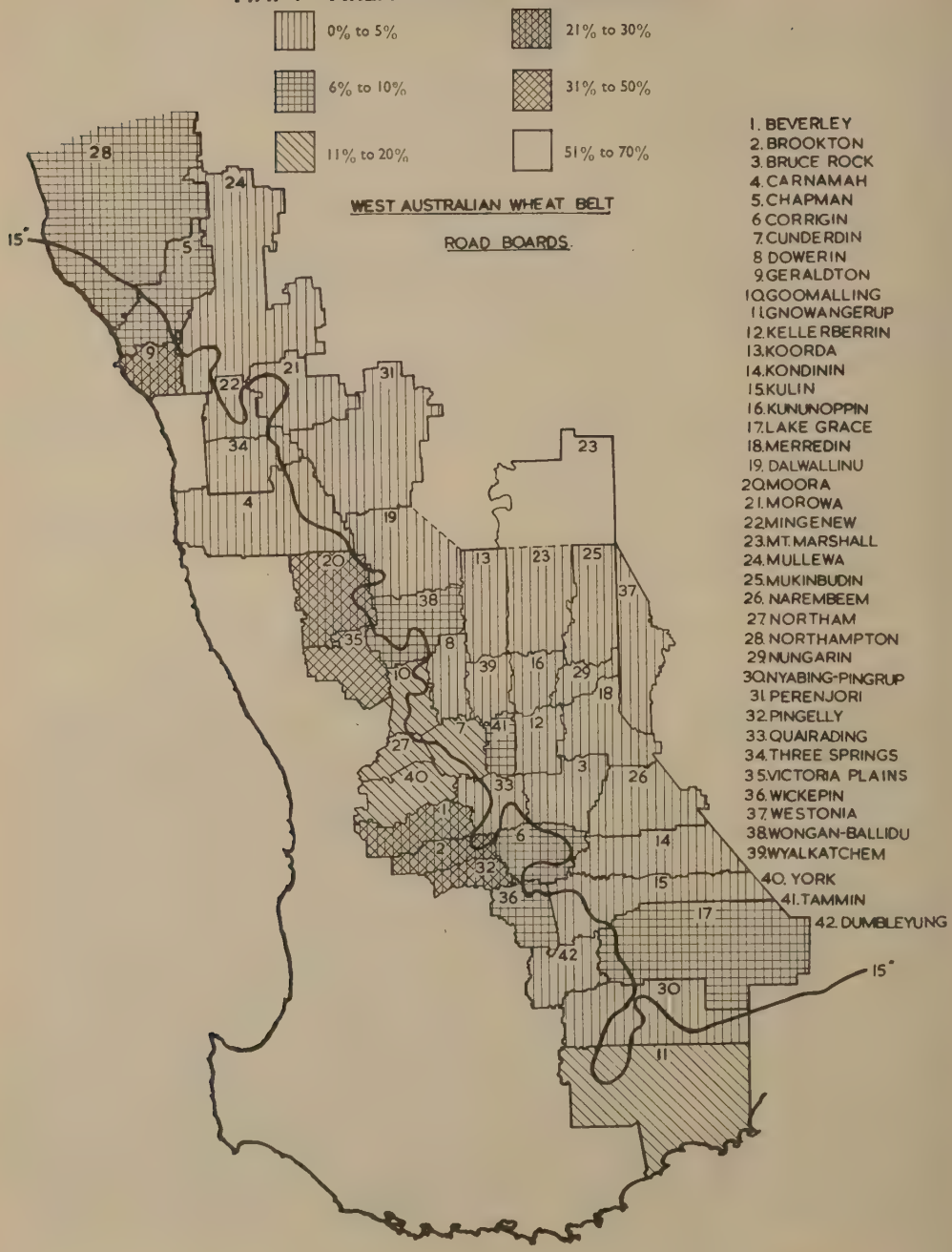
THE cereal-growing areas of Western Australia form a narrow triangle extending about 700 miles from north to south, gradually increasing in width towards the south to about 150 miles.

Their intensive development for agriculture followed the decline of the gold industry about 60 years ago with much clearing of land after the 1914-18 and 1939-45 wars. The expansion during the decade 1920-30 to the present limits of the wheatbelt was directed principally to the soils of heavier texture best suited to wheat production. Subsequent development has been of necessity restricted to the intervening lateritic soils.

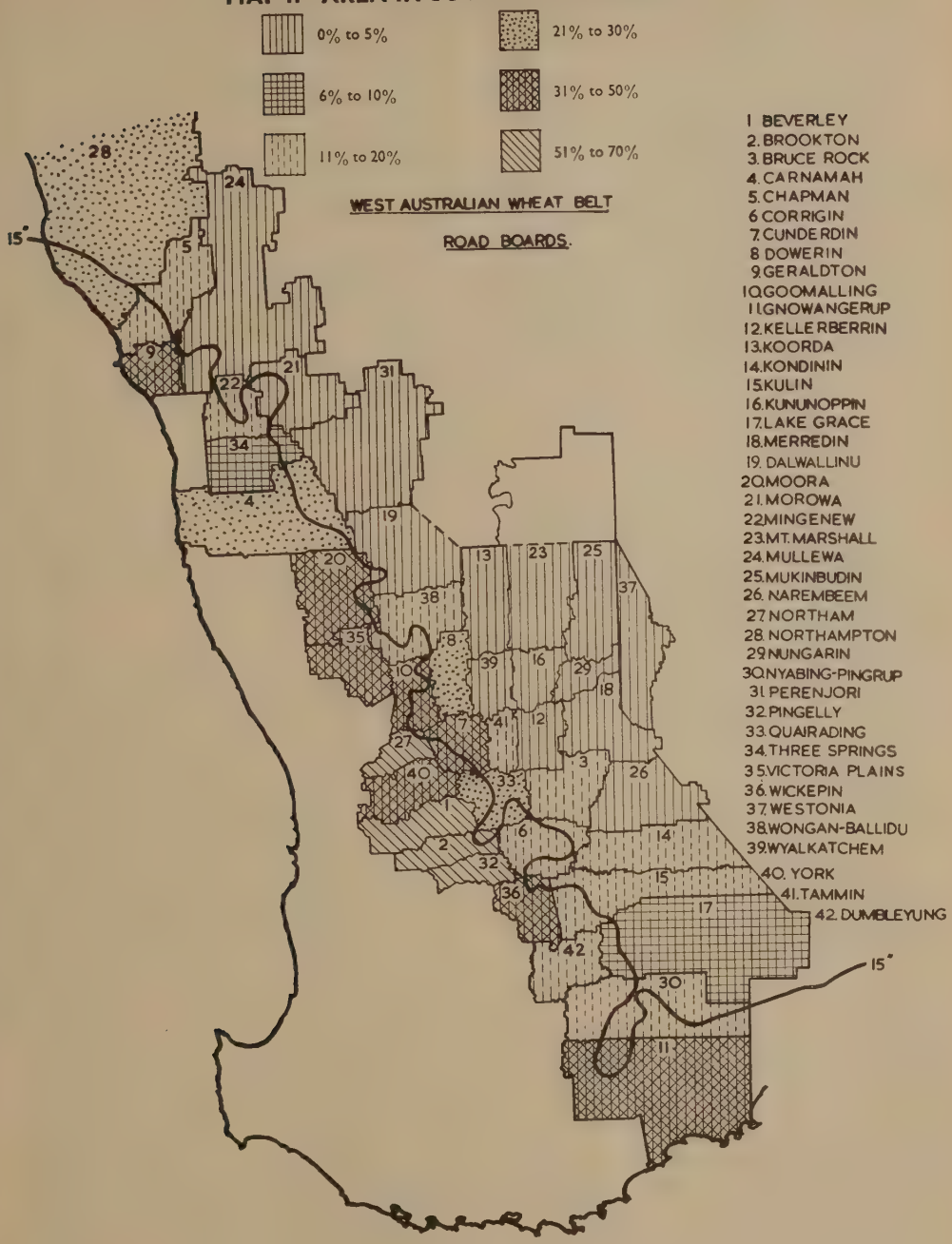
Much fairly acid soil occurs in regions of low rainfall and few surface soils are above pH 6.5. This pattern of soil pH has

Fig. 1.—Each of the whitetopped markers indicates a Geraldton sub-clover seedling on a portion of a plot at Southern Cross at the beginning of the 1958 season. This followed two seasons with an effective rainfall of only five inches

MAP I — AREA IN SOWN PASTURE 1948



MAP II– AREA IN SOWN PASTURE 1958



markedly influenced the establishment of pasture legumes in the region since until two years ago the techniques necessary to ensure nodulation had not been established.

PASTURE RESEARCH

The effect of farm maturity on rotation practice has been reviewed by Dunne and Shier (1934) who pointed out that the wheatbelt had passed, through the phases "continuous wheat," "bare fallow-wheat" and "bare fallow-wheat-pasture." They stressed that the so-called "pasture year" is "undoubtedly the weak portion of the rotation," for provided the destruction of weeds prior to the sowing of the wheat crop is satisfactory, the term "pasture" for the growth in the following year is, in most cases, a misnomer.

Fig. 2.—The Geraldton strain develops its seed much more rapidly than Dwalganup clover. These photographs show the relative amounts of burr development, 16 days after flowering, of Geraldton (top) and Dwalganup (bottom)

In the three year rotation the "pasture" year fails to provide sufficient bulk for the maintenance of either adequate soil organic matter or of any large number of sheep.

For the wetter section of the wheatbelt receiving more than 16 inches of rainfall they recommended Dwalganup sub-clover as the renovating legume for five years in each rotation cycle.

Over the years 1948-9 to 1958-9 the area of arable land in the wheatbelt increased by 48 per cent. from twelve million to 17.8 million acres. The area planted to cereals increased by 1.6 million acres but remained relatively constant as a percentage, 29 per cent. as against 30 per cent. The area in leguminous pasture as a percentage of the total arable land rose by eleven per cent. from 0.88 million acres to 3.2 million acres. Most of the increase occurred on the wetter margin of the wheatbelt where the annual rainfall is above 15 inches and it is evident that after a decade of favourable seasons and buoyant economic conditions, legumes have no significant role in farming 13 of the 18 million acres of available land. In effect, a greater acreage is now being subjected to farming without legumes than in 1948-9.

Data from trials at the Wongan Hills Research Station, show that the introduction of sub-clover gives a 50 per cent. increase in sheep carrying capacity and grain yield.

CURRENT RESEARCH

Following a suggestion to the Merchants' Agricultural Research Trust by the Director, Professor E. J. Underwood, investigations were commenced at the W.A. University Institute of Agriculture in 1949, which had, as their objective, the extension of pasture legumes further into the wheatbelt.

The accumulation and development of new strains has been attempted by cross-breeding, by selection from strains already acclimatised and established in this country, and by the use of plants introduced from outside Australia.

Geraldton Sub-Clover.

While cross-breeding, because it permits of purposeful breeding, is the favoured means of obtaining superior strains, there is considerable potential in plants which have withstood "natural selection." At the outset of the investigation collections were made of sub-clover plants which had established themselves in the wheatbelt and among these was a strain collected at Moonyoonooka on the Geraldton-Mullewa road in August, 1950. This was

grown in observation rows and included in very small plots at Merredin Research Station and elsewhere. When the plots at Merredin were visited on October 16 1954, it was noted that although the Geraldton strain flowered nine or so days after Dwalganup, it matured a week earlier. Much of the burr was formed above ground and it appeared from glasshouse tests to mature seed much more rapidly than Dwalganup.

Geraldton has been compared with Dwalganup in over thirty trials throughout the wheatbelt. In the 1957 series of trials it gave on the average of eight trials twice as much seed as Dwalganup while in the more favourable 1958 season the difference was 32 per cent.

Planted at Southern Cross in 1955, Geraldton has come through as a sward despite three successive seasons in which the growing period rainfall was 668, 478 and 509 points respectively, there was a dense sward in the fourth year (Fig. 1).

Trials were established in association with the Department of Agriculture in 1958 at six wheatbelt centres. While Geraldton gave a significantly greater yield in three of the trials in the favourable establishment year, it out-yielded Dwalganup at four centres in 1959, which was notable for the very dry spring conditions.

Appendix 1

W.A. WHEATBELT

Acreages under Cereals and Sown Pastures as Percentages of the Total Arable Area

Road Board	Area under Cereals				Area under Sown Pastures				Total Arable Acreage '000 acres		
	1948–49		1958–59		1948–49		1958–59				
	Acreage '000 acres	Per cent. Arable Area	Acreage '000 acres	Per cent. Arable Area	Acreage '000 acres	Per cent. Arable Area	Acregae '000 acres	Per cent. Arable Area	1948–49	1958–59	Per cent. Increase
Beverley	67	25	82	24	66	24	187	55	273	338	24
Brookton	52	22	65	24	63	27	168	61	234	275	18
Bruce Rock	159	35	188	34	9	2	59	11	451	554	23
Caranamah	100	29	134	26	7	2	108	21	350	520	49
Chapman	56	27	95	25	14	7	65	17	209	373	78
Corrigin	128	29	173	31	25	6	102	19	449	550	22
Cunderdin	132	34	135	32	74	19	186	44	392	422	8
Dalwallinu	183	32	282	34	6	1	19	2	570	825	45
Dowerin	120	34	134	34	17	5	54	24	348	393	13
Dumbleyung	92	30	131	32	11	4	58	14	311	411	32
Dundas	11	15	21	16	4	6	23	18	72	129	79
Geraldton	14	20	47	22	15	22	79	37	69	216	213
Gnowangerup	89	26	159	19	41	12	343	42	337	822	144
Goomalling	89	31	99	28	31	11	109	31	290	348	20
Kellerberrin	116	35	142	37	6	2	15	4	333	382	15
Kondinin	79	33	123	31	9	4	43	11	242	403	67
Koorda	55	25	116	31	6	3	2	1	220	373	70
Kulin	96	30	140	28	16	5	67	14	320	492	54
Kununoppin	80	33	100	34	2	1	2	1	241	292	21
Lake Grace	86	29	141	26	18	6	56	10	300	545	82
Merredin	123	34	165	34	1	....	7	2	367	489	33
Mingenew	45	27	95	30	3	2	40	13	166	315	90
Moora	121	27	180	27	95	22	247	37	441	664	51
Morawa	116	38	160	35	6	2	8	2	303	458	51
Mount Marshall	59	22	134	28	0·5	....	2	....	269	473	76
Mukinbudin	46	24	80	27	0·1	....	2	1	190	301	58
Mullewa	71	30	131	30	0·5	....	4	1	235	444	89
Narembeen	106	50	172	34	1	....	21	4	213	509	139
Northam	55	30	51	24	36	19	116	54	186	213	15
Northampton	51	26	98	25	16	8	83	21	196	392	100
Nungarin	34	27	57	32	3	2	1	1	125	179	43
Nyabing-Pingrup	57	30	92	27	6	3	53	16	193	336	74
Perenjori	111	22	183	35	4	1	12	2	332	529	59
Pingelly	44	23	53	23	43	23	132	57	191	232	21
Quairading	111	31	141	33	17	5	101	24	356	422	19
Tammin	63	36	81	37	10	6	29	13	177	221	25
Three Springs	53	33	68	30	4	....	18	8	162	224	38
Victoria Plains	67	46	101	25	69	47	172	43	147	399	171
Westonia	24	20	56	25	0·06	....	3	1	123	224	82
Wickepin	90	30	112	30	24	8	131	35	299	379	27
Wongan-Ballidu	167	31	222	32	42	8	112	16	531	700	32
Wyalkatchem	94	35	119	39	3	1	4	1	267	309	16
Yilgarn	39	14	96	22	4	1	3	1	275	438	59
York	64	26	72	23	50	20	151	49	250	310	24

Geraldton not only produces more seed than Dwalganup, but equals it in the yield of leaf and stem, so that it is on the whole a better pasture species.

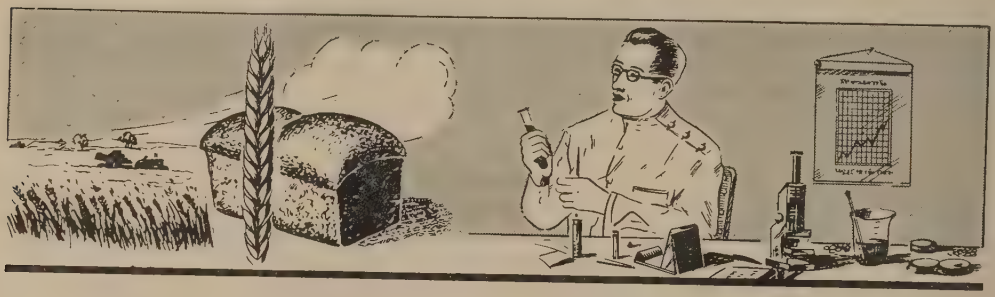
The leaf shapes and markings of the Geraldton and Dwalganup strains are distinctive but they can be identified with greater certainty by means of the flower. The Geraldton strain has a distinctive red band just below the petals.

ACKNOWLEDGMENTS

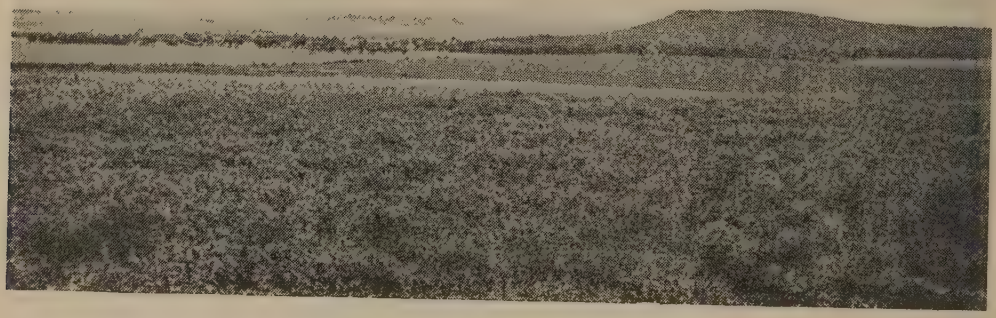
The author would like to express his appreciation of the help and assistance given over the years by the Director of the Institute, Professor E. J. Underwood.

REFERENCES

Dunne, T. C. and Shier, F. L. (1934).—Jn. W.A., Dept. Agric., XI Ser., 2: 254-260.



In Lupin-Land



Large areas of West Australian blue lupins growing on country west of Watheroo. The lupins have been widely utilised in the development of many thousand of acres of light land in the coastal areas north of Perth and inland to the vicinity of the Midland Railway. They have supported large numbers of stock and served as "soil improvers" for the subsequent establishment of other pasture plants. The increasing incidence of lupinosis is causing some concern at present.

● *An experiment conducted for two years at the Muresk Agricultural College provided some interesting facts*

AUTUMN v SPRING SHEARING

By W. L. McGARRY, Officer in Charge, Sheep and Wool Section, and
I. K. STOTT, B.Sc. (Agric.), Sheep and Wool Adviser

IN the agricultural areas of this State it is customary to shear in the late winter or spring, usually some time between July and September. In an experiment conducted at Muresk Agricultural College during the past two years it has been shown that shearing in autumn (March) has resulted in more wool being produced with higher returns than when shearing at the conventional time.

For the two-year period of the trial the average cut per head of the autumn shorn sheep was 11.75 lb. compared with 10.54 lb. from those shorn in the spring. Adjusted to one level the average price of the autumn-shorn wool was 56d. per lb. compared with 57.2d. per lb. for spring-shorn wool. The average return per head from the autumn-shorn sheep was £2 14s. 10d., compared with £2 10s. 3d., from the spring-shorn sheep.

Statistical analysis showed that in both years, the wool weight differences were significant at the 1 per cent. level. Although in both years there was a large difference in lamb marking percentages in favour of the autumn shorn group, these differences were not statistically significant.

EXPERIMENTAL DETAILS

The experiment was commenced after the 1956-57 (December) mating, when 60 six-tooth Merino ewes mated to Border Leicester rams were selected from the College flock. They were divided at random into two groups of 30 and given numbered ear tags. Group 1 was to be autumn-shorn and Group 2 spring-shorn. Average body weights at this stage were 117.87 lb., in Group 1 and 114.66 lb. in Group 2.

From then on both groups were run in the same paddock and given the same treatment. Body weights were taken at monthly intervals. There was not significant body weight variation between the groups.

On March 31, Group 1 were shorn and Group 2 crutched. At this stage, the groups were put in separate but even paddocks for lambing.

Lambing, commenced on May 13. Birth weight, number of sets of twins, drop and marking percentages were noted. Lambs were weighed at monthly intervals until weaning.

Group 2 were shorn on September 9 and Group 1 completed their 12 months wool growth and were shorn at the end of March, 1958.

RESULTS 1957/58

	Group 1 (Autumn-shorn.)	Group 2 (Spring-shorn.)
Av. greasy wool—weight	12.33 lb.	11.19 lb.
Av. Price—lb.	55.4d.	52.2d.
Av. Return—sheep	£2 14s. 9d.	£2 8s. 9d.
Av. Weight of fleece wool	8.58 lb.	8.53 lb.
Av. weight of skirtings	3.75 lb.	2.66 lb.
Per cent. tender fleeces	4%	23%
Per cent. lambs dropped to ewes mated	110%	86%
Per cent. lambs marked to ewes mated	106%	83%
No. sets of twins	6	3
Av. birth weight lambs	10 lb.	9.5 lb.
* Av. weaning weight lambs	66.1 lb.	68.9 lb.

* 13/9/57.

The experiment was repeated for a second year with the same groups of ewes.

RESULTS 1958/59

	Group 1 (Autumn-shorn.)	Group 2 (Spring-shorn.)
Av. greasy wool—weight	11.0 lb.	9.78 lb.
Av. clean wool—weight	6.84 lb.	6.04 lb.
Av. price—lb.	58.6d.	62.3d.
Av. return—head	£2 13s. 9d.	£2 10s. 9d.
Av. weight of fleece wool ...	7.1 lb.	7.18 lb.
Av. weight of skirtings	3.9 lb.	2.6 lb.
Per cent. tender fleeces	10%	60%
Per cent. lambs dropped to ewes mated	100%	67
Per cent. lambs marked to ewes mated	87	63
No. set twins	5	1
Av. Birth weight lambs	7.95 lb.	8.5 lb.
* Av. weaning weight lambs	63.4 lb.	71 lb.

* 5/9/58.

appetite and wool growth through shearing was greater in the autumn than in the spring.

No attempt was made to "manage" for the prevention of grass seeds and although the autumn-shorn group carried more seed it did not appear to affect their thrift. As was expected, skirting had to be heavier in the autumn-shorn sheep (approximately 50 per cent heavier in both years). It is considered that with management aimed at minimising grass seed infestation this handicap to autumn shearing could be largely overcome. Two ways of doing this are "topping" with a mower or "shattering" with a cable. The latter

DISCUSSION

Wool.—In both years the autumn-shorn group cut significantly more wool than the spring-shorn group. In the second year when clean wool weights were considered the autumn-shorns were still superior. It is considered that the autumn-shorn sheep grew more wool because the stimulation of

method is a quick cheap method of greatly reducing the grass seed handicap over large areas.

The percentage of tender wool was much less from the autumn-shorn sheep (4 per cent. compared with 23 per cent. in the first year, and 10 per cent. compared with 60 per cent. in the second year). By

shearing in the autumn the wool is shorn through where the break usually occurs and as a result, any staple weakness disappears or is of minor importance. With spring shearing this mid-season "break," caused by poorer nutrition in the late summer and autumn and aggravated by lambing tends to be in the middle of the staple.

The autumn-shorn wool was significantly less tender, was drier and higher yielding but had more seed than the spring-shorn. However, the main seed difference was in the pieces and bellies. There was little difference in the seed content of the fleece wool from both groups. The average quality (count) of both groups did not vary much. The autumn-shorn wool was more "locky" and fleeces more difficult to handle than the spring-shorn wool. In the first year the average price per pound was 53.4d. for the autumn and 52.2d. for the spring wool. In the second year the autumn wool averaged 58.6d. and the spring 62.3d. Overall the autumn wool averaged 56d. lb. and the spring-shorn wool 57.2d. lb.

Because of the extra weight, returns per head in both years were in favour of the autumn-shorn group.

Lambs.—An autumn (March) shearing before an autumn (May) lambing is, in effect, a pre-lambing shearing. It is well recognised that sheep thrive better "off shears" and, for this reason, it was anticipated that, apart from the effect on the wool, autumn shearing would be beneficial in that ewes would be thriving better at lambing time. Ewes would be better mothers with free access to the teats, less liable to become cast and unable to get to their feet, more inclined to seek shelter with the lambs and, with the better thrift, would go increased milk production. These are basic concepts which are still probably true, but in this experiment, they did not show out. Thrift of ewes and lambs in both groups was very similar. Birth weight of lambs was practically identical as were weaning weights when allowances was made for the extra twins in Group 1. It must be remembered, however, that sheep in the experiment were intensely managed. Ewes, particularly at lambing time, were given close attention and feed was ample. Under flock conditions it is much more likely that the advantages suggested would show out.

It is interesting, but not statistically significant, to note that in both years there were over 20 per cent. more lambs marked in the autumn than in the spring shorn groups. In other words, the differences apparent for marking percentage can be assumed to have occurred merely by chance. Further work may be warranted on this aspect.

SUMMARY

Systems of autumn and spring shearing with an autumn lambing have been compared.

An increase in weight of wool per head for the autumn-shorn sheep resulted.

Returns per head were slightly in favour of those sheep shorn in the autumn.

The thrift of lambs was similar in both groups, but under flock conditions an advantage to the lambs from the autumn shorn ewes can be anticipated.

Marking and drop percentages were higher from the autumn-shorn ewes but these differences were not significant.

Shearing in autumn is as good, or better, than shearing at the conventional time in spring. How either time "fits in" with the management on any particular farm is the governing factor in the final decision.

The authors wish to express their thanks to the Principal and staff of Muresk Agricultural College for their co-operation and assistance in carrying out this trial.

ARE YOU ON OUR MAILING LIST?

"The Journal of Agriculture of Western Australia" is posted free of charge to bona fide farmers in this State. If you are not receiving the Journal write to, The Editor, "Journal of Agriculture," Department of Agriculture, Perth, giving your name and address (block letters please) together with your location number.

Non-farmers, or farmers not resident in Western Australia may receive the Journal, post free, on payment of an annual subscription of £1.

'Phenovis' — Brand of Phenothiazine

use...

HIGH PURITY 'PHENOVIS'

PHE.92X.5845

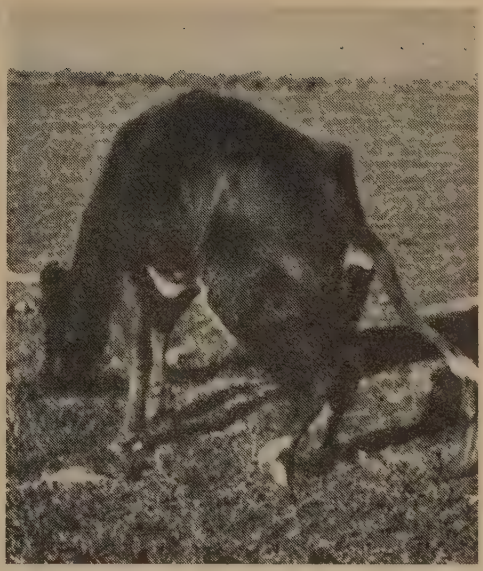
IMPERIAL CHEMICAL INDUSTRIES OF AUSTRALIA & NEW ZEALAND LTD.

Available from.... GOLDSBROUGH MORT & CO. LTD.
and WESTRALIAN FARMERS CO-OP. LTD.

● *An attractive plant can be dangerous to cattle*

Zamia Palm Poisoning

Some notes by
F. C. WILKINSON, B.V.Sc.
Veterinary Surgeon



A heifer suffering from Zamia palm poisoning, showing lack of control of the hindquarters

THE Zamia palm *(Macrozamia Reidlei)* is a common plant in the jarrah and karri forest country and on the coastal plains and is one of the earliest recorded Australian poison plants.

Vlaming in 1697, La Perouse in 1788, Flinders in 1801 and Sir George Grey in 1839 all mention Zamia palm as causing sickness in men eating the "nuts" or seeds, and the effects of Zamia palm poisoning in cattle have been recognised since the earliest years of settlement in Western Australia.

Zamia palm poisoning in cattle results in a chronic nervous condition commonly referred to as "rickets" or "wobbles" as the animals appear to lose control of their hindquarters and move with a staggering gait.

Badly-affected animals may fall and be unable to rise without assistance. In less severe cases, the animals are able to move around and feed, but the partial paralysis usually persists throughout their lifetimes.

A quarter of a century ago, when large numbers of cattle were allowed to run in "bush" country, "rickets" or "wobbles" was a fairly common disease, and cows affected to a greater or lesser degree were frequently seen in the South-western portions of the State.

Today, with most of the State's cattle running on improved pastures or in areas where the Zamia palm is seldom encountered, cases of "wobbles" are rare and many stockowners appear to be unaware of the potential danger presented by these plants.

The mature leaves of the Zamia palm are unattractive to cattle and are rarely eaten if more palatable forage is available. The young leaves, which appear following bushfires or on newly-cleared country, are readily eaten by stock however and are responsible for most of the cases of Zamia palm poisoning recorded in this State.

Both the leaves and the "nuts" or seeds have caused poisoning when fed experimentally to cattle and sheep, but the only naturally-occurring cases of Zamia palm poisoning in Western Australia have been in cattle which have eaten the leaves.

SYMPTOMS

An early symptom of poisoning appears to be a curvature of the spine in front of the loins which becomes more evident as the lack of control of the hindquarters increases. Scouring caused by gastro-enteritis, and jaundice shown by a yellow colouring of the lining of the eyes and mouth, are also common features of the disease.

There is unfortunately no known treatment which will help the animal to overcome the disease. If symptoms of poisoning are noticed, the animals should be moved to a paddock which is free from Zamia palm to avoid further ingestion of the leaves.

FEEDING DAIRY CALVES

Faults in feeding are the most frequent causes of unthrifty calves. Soon after it is born—within an hour or two of its entry into the world—the calf should get its first feed from its mother. It is particularly important to get this first milk or colostrum, as it provides the calf with certain substances necessary to health which it cannot get from ordinary wholemilk.

How Long Should the Calf be Left with the Cow?

Opinions differ, but 24 hours is usually sufficient. If the calf is left longer, there may be difficulty in teaching it to drink from the bucket later on, and the cow will fret more over the loss of her calf. After the first 24 hours, remove the calf from the cow and give it good, clean, dry and warm quarters.

During the first three days the calf should receive wholemilk, preferably from its own mother, and should be fed twice a day in two equal feeds of 4 to 4½ lb. each feed. After the third day, whole milk from another cow may be given and it should be fed at the same rate for the remainder of the week. During the **second** week still feed wholemilk, increasing the quantity slightly to 9 or 10 lb. per day, in two equal feeds.

It would be uneconomical to feed wholemilk throughout the life of the calf, so from the **third** week one-quarter of the wholemilk can be replaced by skim milk; feeding 10 to 11 lb. per day. During the **fourth** week feed half whole and half skim milk using 11 to 13 lb. per day. In the **fifth** week use one-quarter whole and three-quarters skim milk at the rate of 12 to 14 lb. per day. From then onwards, skim milk only, gradually increasing the quantity fed to 14 to 16 lb. per day.

The quantities given are for average-sized calves up to 60 lb. birth weight. For very big calves the feed should be increased proportionately.

Skim milk feeding should continue until four months old wherever possible; weaning is best carried out between the fifth and sixth months.

During the third week, it is wise to commence feeding a small quantity of crushed grain (wheat, oats, or barley) and this could be fed by placing a small handful of the grain in the feeding bucket after the calf has finished its drink. This quantity can be increased gradually so that at the end of the first month the calf will be receiving 1 lb. of crushed grain per day. At the end of the second month, 2 lb., and at the end of the third month, 3 lb. of this grain per day should be given.

Good pasture will grow good calves, and from the second week onward see that the calves have access to clean succulent feed.

LIBRARY SERVICE OF W.A.

BOOKS... *for FARMERS*

THE following books on agriculture, recently published and obtainable to order from most booksellers, have been added to the stock of the Library Board of W.A. and may be borrowed freely from any public library associated with the Board, or consulted at the State Library of Western Australia.

GENERAL

AGRICULTURE AND ANIMAL HUSBANDRY IN INDIA; by M. S. Randhawa. New Delhi, 1958.

FARM MANAGEMENT

FARM BUSINESS MANAGEMENT: Its Principles and Applications; by D. G. Pearce. Edin., 1958.

FARM WORK STUDY: A Basic Guide for the Farmer, Poultry Keeper and Market Gardener; by N. Harvey. Lond., 1958.

CROP MANAGEMENT

THE GRAFTER'S HANDBOOK; by R. J. Garner. Rev. Ed. Lond., 1958.

AGRICULTURAL MACHINERY

MACHINES ON THE Farm: Time- and Labour-Saving Methods of Operation; by H. J. Hine. Lond., 1959.

IRRIGATION

WATER AND THE CYCLE OF LIFE; by J. A. Cocannouer. N.Y., 1958.

DISEASES AND PESTS

HANDBOOK OF DEPENDABLE PLANT PROTECTION PRODUCTS; [Published and Compiled by] Imperial Chemical Industries of Australia and New Zealand Limited. [Melb., 1957?].

HANNA'S HANDBOOK OF AGRICULTURAL CHEMICALS; by L. W. Hanna. 2nd Ed. Forrest Grove, Oregon, c1958.

THE RABBIT PROBLEM IN AUSTRALIA: Conference Convened by C.S.I.R.O. and held at Melbourne, September 11-12, 1958. Melb., 1959.

THE SCIENTIFIC PRINCIPLES OF CROP PROTECTION; by H. Martin. 4th Ed. Lond., 1959.

SUMMARIES OF PAPERS OF THE FOURTH INTERNATIONAL CONGRESS OF CROP PROTECTION, held at Hamburg 1957. [Hamburg, 1958?].

TOBACCO DISEASES AND DECAYS; by F. A. Wolf. 2nd. Ed. Rev. and Enl. Durham (N.C.), 1957.

WEED CONTROL HANDBOOK, [Issued by the] British Weed Control Council. Oxford, 1958.

FIELD CROPS

BARLEY VARIETIES-EBC; by G. Aufhammer, Pierre Bergal, F. R. Horne; composed under the Auspices of the Barley Committee of the European Brewery Convention. 2nd. Ed. Amsterdam, 1958.

CASTOR, by L. G. Kulkarni. Hyderabad, 1959.

CLEAN CANE AND THE WORK OF CANE INSPECTORS, issued by the Colonial Sugar Refining Co. Ltd. [Syd.], 1959.

GRASSLAND DEVELOPMENT IN WESTERN AUSTRALIA, issued by Cuming Smith & Mount Lyell Farmers Fertilisers Ltd. Perth, 1933.

GREEN FIELDS AN PASTURES NEW; by J. E. Hodge, with Contributions by Officers of the Department of Agriculture of South Australia. 3rd Ed., Edited by J. W. Ryan. Adel., [1959?].

PASTURE AND FODDER DEVELOPMENT IN MEDITERRANEAN COUNTRIES: Technical Assistance Mission No. 56, Issued by the Organisation for European Economic Co-operation. Paris, 1951.

RAPE AND MUSTARD; by D. Singh. Hyderabad, 1958.

FRUIT GROWING

ABSTRACT BIBLIOGRAPHY OF FRUIT BREEDING AND GENETICS TO 1955: Rubus and Ribes, A survey by R. L. Knight and E. Keep. Farnham Royal (Bucks.), 1958.

THE COCONUT PALM: A monograph; by K. P. V. Menon and K. M. Pandalai. Ernakulam (S. India), 1958.

DWARF PYRAMID FRUIT CULTURE: A Consideration for the Market Grower; by D. E. M. Wright. Lond., 1959.

FORESTRY

DECAY OF TIMBER AND ITS PREVENTION; by K. T. St. G. Cartwright and W. P. K. Findlay. 2nd. Ed. Lond. 1958.

FOREST MACHINERY; by E. R. Huggard and T. H. Owen. Lond., 1959.

LIVESTOCK

DAIRY CATTLE JUDGING AND SELECTION; by W. W. Yapp. N.Y., 1959.

DIET IN RELATION TO REPRODUCTION AND THE VIABILITY OF THE YOUNG. Part 2: Sheep: World Survey of Reproduction and Review of Feeding Experiments; by W. Thomson and F. C. Aitken Farnham Royal (Bucks.), 1959.

ECONOMIC ASPECTS OF THE ASSOCIATION OF BEEF CATTLE WITH SHEEP PRODUCTION IN SOUTH-EASTERN AUSTRALIA; by K. O. Campbell and W. F. Musgrave. Syd., 1958.

A HISTORY OF BRITISH LIVESTOCK HUSBANDRY. 1700-1900; by R. Trow-Smith. Lond., 1959.

MODERN BREEDS OF LIVESTOCK; by H. M. Briggs. Rev. Ed. N.Y. 1958.

PIG CARCASS EVALUATION; by G. Harrington. Farnham Royal (Bucks.), 1958.

PIG HOUSING, Issued by the Pig Advisory Department of British Oil and Cake Mills Ltd. [Lond. 1959].

PROCEEDINGS OF THE 11th DISTILLERS FEED CONFERENCE, held at Cincinatti, 1956. [Cincinatti, 1956?].

SHEEP. Part 1: Sheep Husbandry; by P. G. Stevens. Christchurch (N.Z.), 1958.

THE SHEEP BOOK; by J. McKiney. N.Y. 1959.

THE SHEPHERD'S GUIDE TO THE PREVENTION AND CONTROL OF THE DISEASES OF THE SHEEP; Compiled by J. R. Greig. 3rd Ed. Edin., 1958.

POULTRY

KEEPING CHICKENS IN CAGES; by R. C. Hartman and D. F. King. Redlands (Calif.), 1956.

DAIRYING

REPORT ON RECENT VISIT TO VICTORIA TO INVESTIGATE COLLECTION OF MILK FROM FARMS BY ROAD TANKERS [by W. J. Taylor]. Issued by the South Australian Metropolitan Milk Board. Adelaide, 1958.

BEE-KEEPING

BEE-KEEPING IN VICTORIA. 1958 Ed.; by D. F. Langridge [AND] C. D. Ilton. Issued by the Victorian Department of Agriculture. Melb., [1958?].

MORE WORK per gallon

The unsurpassed high anti-knock quality of Mobilpower Kerosene means maximum power at draw-bar, greater engine protection and economical operation. The absence of detonation, even under the strain of "peak loads," prolongs engine life and saves fuel. Furthermore, Mobilpower Kerosene is of high volatility, ensuring speedy switch-over from start-up and faster warm-up.

And if you operate diesels — use Mobil Distillate. The use of Mobilpower Kerosene or Mobil Distillate means maximum economy in fuel usage.

For your pocket's sake — Change to Mobil Fuels.

MPD 586

Mobilpower Kerosene
Mobil Distillate

ALL DEPOTS AND AGENTS — VACUUM OIL COMPANY PTY. LTD.

More dogs die from over-feeding than from underfeeding says

F. C. WILKINSON,

Veterinary Surgeon

How Much Food Should I Give My Dog ?

THIS is a question which every veterinary surgeon has heard hundreds of times, and one that it is impossible to answer in general terms because dogs differ so much in their food requirements and because the nutrient values of various foodstuffs vary considerably.

Naturally, the size and weight of the dog will be the best guide to the quantity of food he requires. A dog which is merely a household pet does not need as much food as a sheep-dog or cattle-dog which is working hard every day.

When kangaroos and rabbits were more plentiful than they are today, they provided a substantial part of the average farm dog's rations, augmented periodically with offal from sheep slaughtered for household use.

At the present time, however, meat for the dogs is in short supply on many farms and it is worth remembering that meat need only comprise about one-quarter of the ration, the rest of the diet being made up of carbohydrate foods. Even the 25 per cent. of meat can be effectively replaced by meatmeal.

Among many dog owners, certain misconceptions exist concerning the value of nutrients in foodstuffs other than meat.

Dogs for instance, contrary to popular belief, digest and absorb starches and sugars (carbohydrates) as efficiently as we ourselves do. Carbohydrate diets supplemented with vitamins and minerals can be used successfully to make up 50 per cent, to 60 per cent. of the dog's total diet. Fats also are readily digested and efficiently used by dogs, and lard and beef tallows can be used for up to 10 per cent. of the ration. In actual fact the digestive system of the dog is very like that of humans and it can eat and utilise similar foods. Thus a wide variety of foodstuffs can be fed to dogs.

A working dog of 30 lb weight should receive a total feed of 1 lb. of food each

A USEFUL GUIDE FOR FEEDING DOGS

Breed	Body Weight	Whole Meat per Day	Dog Biscuits (or Substitutes) per Day	Total Food per Day
	lb.	oz.	oz.	oz.
1. Pekingese, Miniature Poms, etc.	5–10	2–4	1–2	3–6
2. Pomeranians, Cairn Terriers, etc.	10–15	4–6	2–3	6–9
3. Pugs, Pomeranians, Sealyhams, Scotch Terriers, Fox Terriers, etc.	15–20	6–8	3–4	9–12
4. Cocker Spaniels, Irish Terriers, Kelpies and Cattle Dogs, etc.	20–30	8–10	4–6	12–16
5. Kelpies, Cattle Dogs, Spaniels, etc.	30–40	10–12	6–8	lb. 1–1¼
6. Bulldogs, Airedales, Field Spaniels, etc.	40–50	lb. ¾–1	8–9	1¼–1½
7. Dalmatians, Chows, Small Greyhounds, Collies, etc.	50–60	1–1½	9–10	1½–1¾
8. Irish Setters, Pointers, Retrievers, Greyhounds, Alsatians and dogs of similar size	60–75	1⅛–1¼	10–12	1¾–2
9. Large Alsatians, Bloodhounds and dogs of similar size	75–100	1½–2	12–15	2½–3
10. Great Danes and dogs of similar size	100–150	2–3	1–1½	3–4
11. St. Bernards and dogs of similar size	150–200	3	1½–2	4–5

day given in a single feed at night. Of this amount, ideally about one half should be whole meat and half a cereal food such as pollard, porridge, breakfast food or dog biscuits. (Vegetables such as potatoes can be substituted for the cereal food). This amount of 1 lb. should be slightly reduced if the dog is to work the next day. A slightly heavier dog of 40 lb. weight should receive a total amount of 1¼ lb. of food each day. If the dog does not receive any bones then about a teaspoonful of bonemeal should be added daily to the food.

When meat is not available, meatmeal can be substituted. Many working dogs have a diet consisting entirely of pollard and meatmeal (¾ lb. pollard to ¼ lb. meatmeal), on which they work and thrive.

Dogs should therefore be fed according to their body weight as in the accompanying table. They should receive some meat or meat product, some cereal type food and vegetables if they will eat them. Ideally the prepared food should be fed once a day and preferably at night time.

A final point should be noted—that is, overfeeding is a commoner complaint than underfeeding. Fat, lazy dogs are useless for work, have a shorter life span and commonly suffer from digestive upsets.

Lucerne at Esperance

An experimental paddock of lucerne at the Esperance Research Station. There has been a very successful establishment of about 250 acres of lucerne on fallowed land at the station. Owing to the long growing season, lucerne shows considerable promise in the south coastal areas.

WEED RESEARCH

7.—WEED CONTROL AROUND THE YARD

By G. A. PEARCE, B.Sc. (Agric.), Adviser, Biological Services Division

MANY farmers and city householders have weed problems around houses and sheds which can be readily overcome by treatment with appropriate herbicides. The risk from fire through weeds and unslightly growth can easily be removed and an area free of any plant growth can be maintained with little effort for a considerable period.

Chipping weeds by hand is a laborious and time consuming job. In most cases it is not as effective as using herbicides and is more costly. Most people are quite happy to spray weeds but the mere thought of using a mattock or hoe is distasteful.

The chemicals mentioned in this article are harmful to all vegetation and care should be taken to prevent the spray from drifting on to garden areas. Where heavy rates of application are made, damage to gardens can be caused by the chemical being washed from the treated area.

Fig. 1.—Large haystacks are often held in reserve for a number of years. Adequate firebreaks are a necessity. Chemicals can be used to prevent all plant growth close to the base of the stack

Where it is possible for this to happen damage can be prevented by laying a strip of timber or asbestos alongside the area to a depth of three to four inches. Any chemical washed from the sprayed area will then lodge below this depth.

POST-EMERGENCE

This is a treatment applied to weeds after they have emerged from the soil. The same chemical used can enter the soil and have a residual effect on germinating seeds.

Fig. 2.—A neatly paved bank spoilt by unsightly weed growth. Treatment of the soil between the slabs could prevent this

RESIDUAL PRE-EMERGENCE

This is a treatment applied to the soil before the weeds have emerged, using a chemical which persists in the soil. The weed seeds are killed as they germinate.

In many situations it is desired to prevent the growth of any weeds. Around sheds, along the yard fence, in paths or between cement slabs, prevention is often easier than controlling the weeds after they are well established. By applying a herbicide within a few weeks of the germinating rains all annual weed growth can be prevented for a considerable period.

With this type of weed control it is essential to apply the chemical evenly to a clean soil surface.

If the herbicide does not reach the soil in sufficient quantity, such as when applied to small cracks in bitumenised areas, the control obtained will not be so effective. Under these circumstances it would be preferable to treat the weeds after they have emerged.

However desirable it may be to prevent the growth of weeds, most people realise their problem only after the weeds are well established. Satisfactory control can still be obtained, but if the control measures are undertaken late in the season, the problem of the dead plant material remains. For this reason the treatment should be applied at least six to eight weeks before the end of the normal growing season.

SUITABLE CHEMICALS

In many cases several herbicides can be used to give equally effective control. However, the chemicals mentioned are known to have specific characteristics and therefore vary considerably in their effectiveness against various weeds.

Any spray equipment used should be thoroughly washed with warm water containing a detergent immediately after use.

When faced with a particular problem, study Table 1 and then read that part of

the text detailing the use of the chemical recommended.

Fig. 3.—Weeds growing around houses and sheds are not only unsightly but also present a severe fire hazard. Where cultivation is undesirable, chemicals can be used effectively to keep the ground completely bare

1. 2,4-D (2,4-Dichlorophenoxyacetic acid).

2,4-D is the most widely used herbicide throughout the world. It is used for the control of broad-leaved weeds and at normal rates of application does not affect grasses. The cost of the chemical where 2,4-D is used, is quite small in comparison with the other herbicides mentioned in this article.

The great disadvantage of using 2,4-D around the house is the possibility of causing damage to garden plants and trees. This can happen by the spray drifting as it is applied, or, where 2,4-D ester is used, vaporisation of the chemical some time after application.

For this reason great care should be taken to prevent damage. When spraying near garden areas, the 2,4-D amine should be used, but because of its greater effectiveness 2,4-D ester should be applied where possible.

A suitable solution using either derivative is made by dissolving one fluid ounce of 40 per cent. 2,4-D in one gallon of water. At this rate of application most broad-leaved weeds will be killed. Hard-to-kill weeds, such as doublegee, will be severely affected and a second treatment 10 to 14 days after the initial application will kill any surviving plants.

2,4-D is notorious for contaminating spray equipment and it is essential to clean equipment used for other purposes immediately after use. This can be done by flushing warm water, with a detergent added, through the complete system several times.

2,4-D should not be applied through sprays used in the garden.

2. Amitrol (Amino triazole).

This chemical can be used to kill plants at all stages of growth as well as act as a residual pre-emergence treatment. Applied evenly to a bare soil surface, amitrol remains active and will kill annual weed seeds as they germinate. The period during which this residual action remains effective can vary from six to 14 weeks, depending on the soil type and rainfall.

The suggested rate of amitrol for the control of annual grasses and flat leaved weeds is 20 lb. of 50 per cent. amitrol per acre. A suitable solution is made by dissolving 1 lb. in 5 gals. of water and this is sufficient to treat 240 square yards.

Amitrol is recommended for application as a residual pre-emergence or general post-emergence spray.

3. C.M.U. (Chlorophenyl dimethylurea).

C.M.U. can be used to control all annual weeds. It is most effective when applied to the bare ground shortly after the germinating rains. C.M.U. is not highly soluble and remains effective in the soil for a lengthy period, depending on the soil and the amount of rain.

As a pre-emergence treatment the recommended rate of application is 2lb. of 80 per cent. C.M.U. per acre. A suitable solution is made by dissolving 1 oz. of C.M.U. in three gallons of water. It is essential to keep the mixture well agitated to prevent the chemical from settling. For this type of spraying all debris should be removed from the surface of the ground before the chemical is applied.

C.M.U. can also be used as a post-emergence spray after the weeds are established. The above rate of application

is satisfactory for annual weeds still making young growth but once the weeds form a dense stand the rate of application should be increased to two ounces in three gallons of water.

sufficient to treat 30 square yards. A second spraying should be made seven to ten days after the first application and any regrowth after this time should be treated as it appears.

Fig. 4.—The hand chipping of areas such as this is very tedious and not particularly effective. To spray the affected section would take only a fraction of the time and the treatment would be more lasting

4. Dalapon (Sodium dichloroproprionate).

Dalapon can only be used effectively against grasses. It is absorbed mainly through the leaf and has little or no residual action. A wetting agent should always be added to the spray mixture.

Where grasses are protruding through small cracks in paths, etc., dalapon is the most effective chemical which can be used for control.

With perennial grasses, two applications of dalapon are more effective than one application using a double amount of the chemical. The recommended rate of application is 25 lb. per acre. A second application is necessary and this should be made three weeks after the first treatment. Any regrowth should be treated as it appears. A suitable solution is made by dissolving 1 lb. of dalapon in 6 gallons of water.

Perennial grasses growing under fruit trees can be controlled by spraying with dalapon. To avoid any risk of damage to the trees the rate of application should be reduced to 1 oz. of dalapon in one gallon of water. One gallon of this mixture is

For the general control of annual grasses 1 oz. of dalapon in one gallon of water is a suitable solution.

5. T.C.A. (Sodium trichloracetate).

T.C.A. is another chemical which is used for the control of grasses. However unlike dalapon it is absorbed mainly through the roots and to a certain extent through the foliage. Because of this, rain or irrigation after the treatment is applied is desirable. T.C.A. can be used as a soil treatment for the control of both perennial and annual grasses and has a residual effect.

For the control of perennial grasses the rate of application should be 100 lb. of T.C.A. per acre. A suitable solution is made by dissolving 1 lb. of T.C.A. in one gallon of water. Some regrowth must be expected and this should be treated as it appears.

For the control of annual grasses already established, the use of dalapon is preferred. However, where it is desired to prevent annual grasses from emerging then T.C.A. can be very effective. In such cases T.C.A. at 50 lb. per acre would be effective. If broad-leaved weeds are

present also, then either C.M.U. or amitrol should be used.

6. Sodium chlorate.

Sodium chlorate has been widely used as a general purpose weedkiller for many years. It is non-selective in its action and at the rate of application generally used has little residual effect. However, it acts quickly on plants and its effect is seen within a few hours of application.

A suitable solution is made by dissolving 2 lb. of 50 per cent. sodium chlorate in one gallon of water.

of plant growth may last for several years depending on the type of soil present. It is a powder and must be applied dry, preferably followed by some rain to wash it into the soil.

For the prevention of annual weed growth for a lengthy period Borascu should be applied at the rate of 5 lb. per per 100 square feet, while for perennials the rate should be increased to 10 lb. per 100 square feet.

Being non-toxic, borates are simple to use and are not dangerous to animals or humans.

Fig. 5.—Perennial weeds often cause cracks to form in bitumenised areas. Other weeds soon appear. Regular attention can prevent the surface from gradually breaking up

7. Borates.

A number of various mixtures of borate compounds are available, the most suitable for household use being Polyborchlorate. This line contains 25 per cent. sodium chlorate and 75 per cent. borates, the latter having a residual effect when applied at heavy rates of application.

For the control of general weed growth a suitable solution is made by dissolving 2 lb. of polyborchlorate in one gallon of water.

Another borate mixture, Borascu, is very useful for preventing the growth of annual weeds for a long period. Borascu probably has the longest residual action of any chemical mentioned here; the restriction

8. Arsenic Compounds.

Arsenic compounds have been used for many years as herbicides. They are very quick-acting and effective against most weeds but because of their toxic nature the use of non-poisonous chemicals is preferred.

Arsenic pentoxide is often recommended for sterilising areas on which perennial grasses are growing before the application of gravel or bitumen. The rate of application is 1 lb. of arsenic pentoxide per 10 square yards. Even this treatment could be replaced with Borascu as mentioned previously.

SPECIFIC PROBLEMS

1. Weeds Under Fruit Trees.

For the control of grasses growing around fruit trees which are more than three years old the use of dalapon is recommended. One ounce dissolved in one gallon of water is sufficient to treat 30 square yards. A wetting agent such as a household detergent should be added to the mixture.

With perennial grasses a second application of this dalapon mixture is required some seven to ten days after the initial treatment. Any regrowth should be treated as it appears. For the control of a mixture of broad-leaved weeds and grasses either C.M.U., 1 oz. per 5 gal. water, or Amitrol, 1 oz. per gallon of water can be used.

2. Weeds in Paths.

If the weeds are growing through cracks in bitumen, between cement slabs or through gravel paths one of several chemicals can be used.

For the control of perennial grasses, dalapon should be used at the rate of application already discussed. If it is possible to apply the spray to the soil between the cracks in the path, then T.C.A. could be used to advantage as it has a residual effect.

Weed	Situation of Weeds	Chemical	Application Rate	Remarks
Perennial grasses....	Away from other plants and trees	Dalapon plus wetting agent	1 lb. per 6 gals. water	A second treatment three weeks after first is required. Paspalum requires at least three applications. Spot spray regrowth.
		T.C.A.	1 lb. per 1 gal. water	Rain or irrigation is required to wash chemical into root zone.
	Before applying gravel and sealing surface	Dalapon plus wetting agent	1 lb. per 6 gals. water	Repeat treatment each three weeks until grass is dead. Do not apply gravel until grass is completely killed.
		T.C.A.	1 lb. per 1 gal. water	Repeat treatment when regrowth appears. Ensure grass is killed before adding gravel.
Grasses (annual and perennial)	Under fruit trees	Dalapon plus wetting agent	1 oz. per 1 gal. water	For perennials a second treatment should be applied 10 days after first. Spot spray regrowth.
	Growing through foot-paths	Dalapon plus wetting agent	1 lb. per 6 gals. water	Repeat treatment every three weeks till plants are killed.
Annual grasses	Before emergence	C.M.U.	1 oz. per 3 gals. water	Apply shortly after germinating rains or irrigation.
		Amitrol	1 lb. per 5 gals. water	
	After general emergence	Dalapon plus wetting agent	1 oz. per 1 gal. water	Best results if treatment applied when plants young.
Broad leaved weeds and annual grasses	Before emergence	C.M.U.	1 oz. per 3 gals. water	Apply shortly after germinating rains.
		Amitrol	1 lb. per 5 gals. water	
	After emergence	2,4–D plus dalapon	1 fl. oz. 40% 2,4–D plus 1 oz. dalapon per gal.	Do not spray near garden areas or susceptible crops.
		C.M.U.	1 oz. per 3 gals. water	Suitable only while plants are young.
		Amitrol	1 lb. per 5 gals. water	Apply as a general blanket spray to wet all foliage. Repeat when necessary.
		Sodium chlorate	2 lb. 50% per 1 gal. water	
		Polyborchlorate	2 lb. per 1 gal. water	
Broad leaved weeds	Before emergence	C.M.U.	1 oz. per 3 gals. water	Apply shortly after germinating rains.
		Amitrol	1 lb. per 5 gals. water	
	After emergence	2,4–D	1 fl. oz. 40% 2,4–D per gal. water	Do not spray near garden plants or allow spray to drift. Repeat when necessary.
		Amitrol	1 lb. per 5 gals. water	Use for the control of weeds resistant to 2,4–D or where it is dangerous to apply 2,4–D.
		Sodium chlorate	2 lb. 50% per 1 gal.	
		Polyborchlorate	2 lb. per 1 gal. water	

This table lists the type of weed problems which may exist around houses and sheds. After selecting the herbicide to use, reference should be made to that part of the text detailing the use of the particular chemical.

Fig. 6.—Weeds growing between paving slabs quickly cause an uneven surface to develop. It is virtually impossible to prevent this without the regular application of suitable herbicides

For the control of annual weeds the use of amitrol or C.M.U. is recommended. After the plants already present have been killed a further application to the soil between the cracks will kill any weed seeds as they germinate.

SUMMARY

1. Most general weed problems around the house or sheds can be easily solved by applying a suitable herbicide.

2. Treatments applied at the beginning of the growing season can prevent weed growth for a considerable period.

3. It is important to select the most effective herbicide to control any particular type of weed growth.

4. For a quick answer to your weed problem study the table and read that part of the text giving details of the recommended chemical.

5. All chemicals discussed are harmful to all plants and should not be used among garden plants.

SUBSTITUTE FOR COLOSTRUM

The hand-rearing of orphan animals is always simplified if they have been able to suckle their dams or foster-mothers long enough to obtain some colostrum or "first milk."

This first milk is rich in protein and vitamins and acts as a natural purgative to assist the young animal to clear its intestines of faecal matter accumulated prior to birth. The colostrum also contains antibodies which give protection against harmful bacteria.

A recipe for an artificial colostrum mixture, for use with orphan lambs that have never had a drink from their mothers is:—

26 oz. of warm cow's milk.

1 beaten egg.

1 small teaspoon cod liver oil (or castor oil).

1 dessertspoon of sugar.

The dose rate is up to 6 oz. per feed of this mixture, four times a day for the first two days, after which the lamb should thrive on cow's milk.

TRACE ELEMENTS

Should be applied in correct proportion to the needs of your soil

Varying types and localities of soils require different elements and different rates of application to obtain best results. It is wasteful and often injurious to plant growth if trace elements are applied at greater or lesser rates than are really needed.

GET BARROW LINTON'S

Green-Gro
TRACE ELEMENTS

Free advice by

MR. FRANK BRIDGEMAN

Bachelor of Science, Agric.

Write or call on Mr. Frank Bridgeman, Barrow Linton's agricultural technical, officer for advice on the use of trace elements. Mr. Bridgeman, B. Sc. Agric., is well qualified to help solve your problems of trace element deficiencies

and mix your fertiliser to your own requirements

It is a cheaper, more accurate and more flexible arrangement to purchase trace elements separately and mix with other fertilisers at the rates you desire. In that way you eliminate waste and apply the elements at the rate most suited to the needs of your soil. For this purpose Barrow Linton's are now supplying "GREEN-GRO" Copper Ore Fertiliser and Zinc Oxide. Other trace elements will also be available at an early date. Enquire now about "GREEN-GRO" Trace Elements at

BARROW LINTON'S
76J-T WELLINGTON STREET, PERTH. BA9151

Australian

SPARK ARRESTER TESTS

TEST No. SPA–5, STOCK MODEL, NOVEMBER, 1957

CATERPILLAR 3B–2655

TESTED FOR CATERPILLAR OF AUSTRALIA PTY. LTD.

FORMAL tests on spark arresters are conducted by The Tractor Testing Committee* at the Testing Station, Werribee, on behalf of those companies concerned with tractors, engines or spark arresters who wish to have these equipments tested. The arrester is tested on the engine for which it is specially designed or if this is not convenient (as in this instance) it is tested on an engine having the characteristics and power for which the spark arrester is intended.

1.—Test Procedure.

The method of test is based on a procedure standardised by the Society of Automotive Engineers (U.S.A.); this consists of feeding a weighed quantity of carbon particles of given size into the exhaust of the working engine, and then catching in a trap, and weighing, the particles that the arrester allows to pass through. Separate runs are conducted with particles of larger and smaller size; in some runs the engine is working at full load, in others at fast idle under no load.

According to the S.A.E. standard, no particles of the larger size should escape the arrester, and not more than 10 per cent. of the smaller size. At the same time the extra back pressure imposed on the exhaust system by the presence of the arrester should be no more than 10 inches in a water barometer.

2.—Name and Type of Arrester.

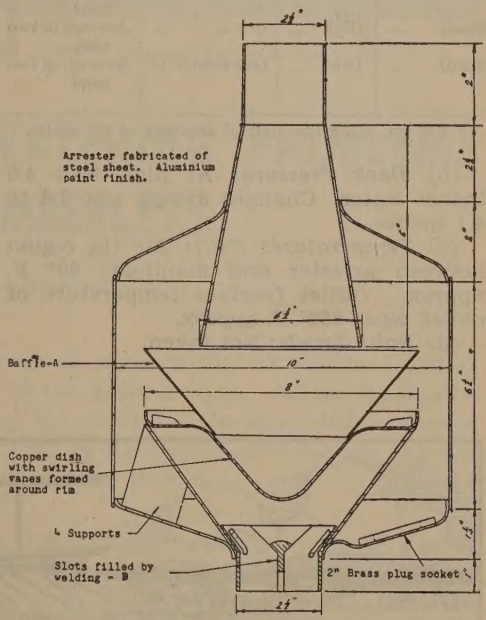
Caterpillar 3B 2655. (Aust. Pattern—see Note (*a*) below.)

Submitted by: Caterpillar of Australia Pty. Ltd.

For Particular Engine: Caterpillar D.311 Diesel Engine.

3.—Brief Specification of Arrester.

Operating Principle: Centrifugal separator.



SPARK ARRESTER FOR CATERPILLAR D.311 DIESEL ENGINE
STOCK MODEL CATERPILLAR 3B2655 (AUST. PATTERN)
TESTS NO.SPA-5, Nov. 1957

* The Australian Tractor Testing Committee is a joint body established by agreement between the Commonwealth, the States, and the University of Melbourne; under this agreement the tests are carried out by the University of Melbourne. The address of the Tractor Testing Committee is: c/o Department of Primary Industry, 301 Flinders Lane, Melbourne.

Declared Maximum Horse-power: 50.

Dimensions: Exhaust pipe, diameter 2½ inches. Tail pipe, diameter 2½ inches, length 2 inches. Arrester, outside diameter 10 inches, length 7⅛ inches, weight 10 lb. (approx.).

Mounting: Vertical.

Relation to Operator: No comment since arrester was not tested on a Caterpillar tractor.

Details of Test Engine: International AW-7 Diesel (Tractor): 49 horse-power maximum; 264 cubic inches; rated speed 1,450 r.p.m.

4.—Summary of Test Results.

(*a*) *Effectiveness of Spark Arrester:* See Notes (*a*), (*b*) below.

Particles injected at rate of 100 gms. in 13 to 15 mins.

Particle Size	Engine Load Condition	Carbon Passing Arrester (Percentage)	Remarks
Large	High	Less than 0·1*	Average of two tests
Large	Low	Less than 0·1*	Average of two tests
Small	High	0·2	Average of two tests
Small	Low	Less than 0·1*	Average of two tests

* 0·1 gm. being the limit of accuracy of the scales.

(*b*) *Back Pressure:* At high load 4.0 inches water. Changes during test 3.8 to 4.1 inches.

(*c*) *Temperatures* (°*F.*): Air (in region between arrester and manifold) 90° F. approx. Outlet (surface temperature of outlet pipe) 550° F. approx.

(*d*) *Noise Levels:* Not taken.

Note:—

(*a*) The arrester tested was a prototype based on the former United States pattern stock model for Caterpillar D. 311 engines. On a randomly-chosen Australian-made stock model, earlier tests had shown 1.4 per cent. large carbon passing at high load. Caterpillar of Australia Pty. Ltd. asked the Committee to carry out a series of developmental tests, as a result of which the modified design shown in the acccompanying sketch and reported in this test was adopted as the Australian stock model. The modifications consist of the interposition of the baffle, A (see sketch), between the swirling vanes and the outlet, and the closing of the slots B, by welding.

(*b*) This report makes no promise about the likely performance of this spark arrester other than in the *new* condition for which it was supplied for test.

5.—Comments.

Cleaning: The position and design of the cleaning plug are such that it is not possible to empty the arrester merely by removing the plug.

Life: The arrester is of the type not able to be dismantled for inspecting and replacing the internal elements. Its expected life, according to the draft specification, should, therefore, be equal to the life of the engine for which it is intended.

We doubt whether the gauge of metal, approximately 24-gauge steel in the top section, would meet this requirement. Copper for the swirling vane element must also be regarded with some suspicion in a situation where it is subject to repeated heating and cooling, and exposed to the full heat of the exhaust gases.

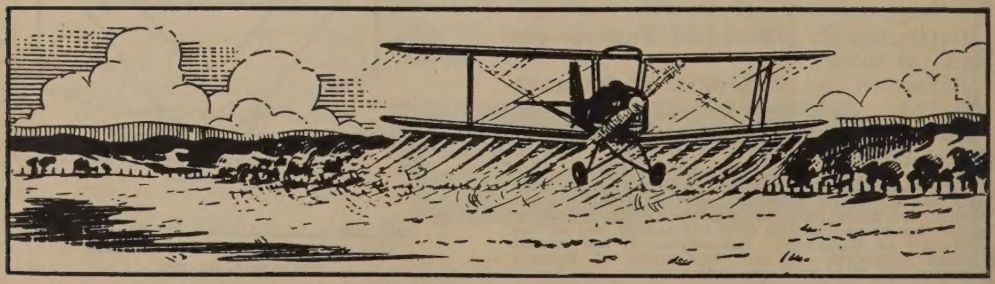
A heat-resisting non-ferrous alloy or a heat-resisting stainless steel would be preferred. It is understood that arrangements are being made to use a stainless-steel element in future production according to the Australian pattern.

On the samples inspected some of the internal welds appeared to be not sufficiently secure.

W. F. BAILLIE,
Testing Officer.

G. H. VASEY,
Officer in Charge
Tractor Testing.

University of Melbourne, 5th December, 1957.



● *This turkey-nest dam makes water available where it is badly needed*

Fig. 1.—A view of the dam and the windmill. Note the growth of grass and shrubs on the banks

OVERCOMING STOCK WATERING PROBLEMS IN THE KIMBERLEYS

By B. SWAN, Adviser, Irrigation Branch

ONE of the ever-present problems of the pastoral areas is that of providing watering-points in reasonably close proximity to the grazing areas. All too frequently, the country on the river frontages and that in the vicinity of the water-holes becomes eaten out and although there may be ample feed on other portions of the run, it is too far distant from the available water to be effectively utilised.

The turkey-nest dam shown in the photographs accompanying this article was constructed to serve a portion of Ivanhoe Station in the East Kimberley area. The dam is on the blacksoil plain and is about 45 ft. in diameter with a capacity of about a million gallons.

A bulldozer was used to throw up a 10 ft. circular wall containing approximately 4,000 cubic yards of soil which, being of a clayey nature, holds water very well.

Water was found in good supply at 40 ft. depth and this is pumped into the dam by a 22 ft. windmill on a 40 ft. tower. A

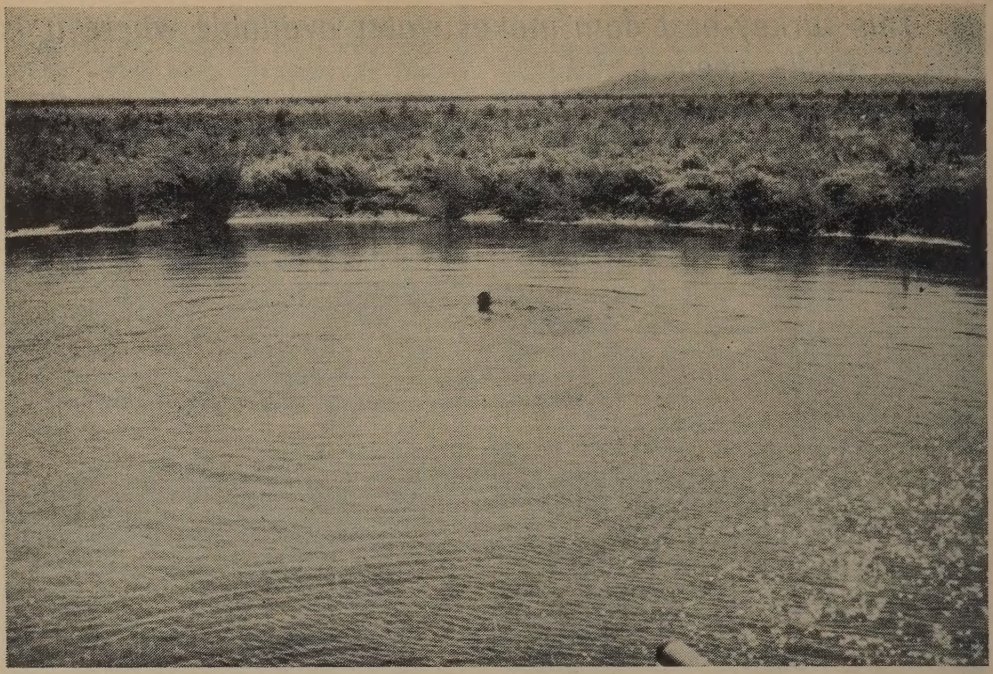


Fig. 2.—Cooling off in the dam which holds from 10 to 12 ft. of water in the centre

small diesel engine is also mounted over the bore to operate the pump in case of a "wind drought" or in case the windmill should be out of action from other causes.

Two wide, shallow "borrow-pits" were excavated near the dam to provide extra soil for the walls, and these depressions fill with water and serve as an auxiliary supply for part of the year.

The turkey-nest dam is fenced and stock-proof, and the bank has grassed over rapidly to consolidate the earth.

The stock are watered at a galvanised iron trough 75 ft. long and 28 in. wide fitted with a ball-tap feed. The trough serves two paddocks by means of a staggered fence.

The overall cost of such a set-up would be approximately £2,500 and it should soon pay for itself by bringing a large area of country into production.

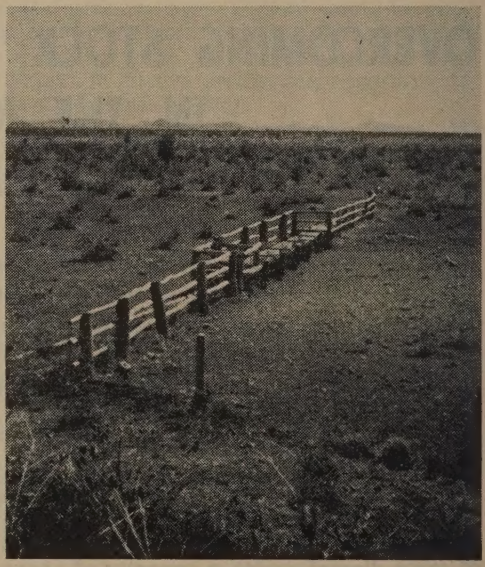


Fig. 3.—The trough with a staggered fence to serve two paddocks